NOISE ELEMENT
Thousand Oaks General Plan

NOISE ELEMENT
THOUSAND OAKS GENERAL PLAN

Prepared by:

Thousand Oaks Planning and
Community Development Department

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PART 1. INTRODUCTION

Noise has become a key factor in the perception of the quality of our environment. Noise affects both the home and work environment, and enjoyment of recreational activity. For these reasons, noise is an important issue in the community planning process.

The State of California has mandated that each county and city prepare a noise element as part of its general plan. California Government Code, Division 1, Planning and Zoning, Chapter 3, Local Planning, Article 5, Section 65302(f) requires a plan including:

> "A noise element which shall identify and appraise noise problems in the community. The noise element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:
>
> 1. Highways and freeways.
>
> 2. Primary arterials and major local streets.
>
> 3. Passenger and freight on-line railroad operations and ground rapid transit systems.
>
> 4. Commercial, general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation.
>
> 5. Local industrial plants, including, but not limited to, railroad classification yards.
>
> 6. Other ground stationary noise sources identified by local agencies as contributing to the community noise environment."

Noise contours (lines which graphically depict noise exposure) for the City are shown for all relevant noise sources and stated in terms of Community Noise Equivalent Level (CNEL). The noise contours represent lines of equal noise exposure, just as the lines on a weather map indicate equal temperature or atmospheric pressure. The contours provide a visualization of estimates of sound level. Landforms and manmade structures have very complex effects on sound transmission and on noise contours. Generally, barriers between a source and receiver absorb and/or reflect

noise resulting in a quieter environment. Where barriers or land forms do not interrupt the noise transmission path from source to receiver, the contours prove to be good estimates of the average noise level. In areas where barriers or landforms interrupt the sound transmission, the noise contours overestimate the extent to which a source intrudes into the community. Unfortunately, it is virtually impossible for the Noise Element to analyze each roadway segment of the city for barrier noise attenuation. Therefore, where specific projects are proposed within noise impacted areas, an acoustical analysis should be completed to evaluate the noise reduction provided by any barriers to the noise path. The CNEL noise contours were prepared on the basis of state prescribed noise modeling techniques for various sources. The noise contours are used as a guide for establishing land uses which are compatible with the noise environment and that minimize noise exposure to sensitive land uses.

The purpose of this document is to provide an easily understood discussion of noise, its impacts and possible solutions. Following the Introduction, a Definitions section is provided to assist the reader in understanding the more commonly used noise terminology. The noise element specifically discusses noise characteristics and compatibility criteria, documents the existing and future noise environment in the community as required by Government Code, Section 65302(f), establishes goals, policies, and programs describes noise mitigation measures, land use planning actions, the relationship to other elements of the general plan and procedures for enforcement.

The effects of noise are described in detail in this document. However, in general, when the noise environment reaches 65 dB CNEL, outdoor speech interference occurs, 15 percent of the population is highly annoyed, a significant community reaction can be expected and noise is considered an adverse aspect of the community environment (see Table 20). At 60 dB CNEL, outdoor speech interference is not as significant, 9 percent of the population is highly annoyed, a moderate community reaction can be expected and noise is no more important than other environmental factors, such as air quality and traffic congestion.

PART 2. DEFINITIONS

A-Weighted Sound Level (dB(A))

An A-weighted sound level is the sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and provides good correlation with subjective reactions to noise.

Ambient Noise Level

The combined noise from all sources near and far is the ambient noise level. The ambient noise level is the existing level of environmental noise at a location.

Community Noise Equivalent Level (CNEL)

A CNEL is average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels occurring during the evening from 7 p.m. to 10 p.m. and addition of ten decibels to sound levels occurring during the night from 10 p.m. to 7 a.m. The 5 and 10 decibel penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. The CNEL represents the daily energy noise exposure averaged on an annual basis. It is not measured, but computed. The State of California uses the dB CNEL noise index to relate community noise exposure to compatibility criteria. Typically, minor roadways do not generate sufficient noise to create a 65 dB CNEL value off the roadway while major arterials and freeways can create 65 dB CNEL values extending hundreds of feet into adjacent properties

Day-Night Average Level (Ldn)

The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of ten decibels to sound levels occurring during the nighttime from 10 p.m. to 7 a.m. The 10 decibel penalty is applied to account for increased noise sensitivity during the nighttime hours. The Ldn represents the daily energy noise exposure averaged on an annual basis. Where evening sound levels are not substantial, an Ldn

value is generally within 2 dB of a CNEL value. However, where loud events occur between 7 p.m. to 10 p.m., such as a go-cart or outdoor concert facility, an Ldn value could be well below a CNEL value that applies a 5 dB penalty to that time period.

Decibel (dB)

A decibel is the unit for measuring sound pressure level and is equal to 10 times the logarithm (to the base 10) of the ratio of the measured sound pressure squared to a reference pressure (i.e. 20 micro-pascals) squared. More simply put, decibels are measured in a similar manner to the Richter scale which measures the magnitude of earthquakes.

Equal Noisiness Zones

Areas or regions of a community wherein the noise levels are generally similar (within a range of 5 dB) are defined as equal noisiness zones. Locations approximately equal distances from noise sources and within similar noise contours would be exposed to similar levels of noise.

Equivalent Sound Level (Leq)

Leq is the sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. An Leq value is designed to average all of the loud and quiet sound levels occurring over a time period. For example, during a 15-minute period, the peak noise level may be 80 dB(A) from a truck and the background noise level 62 dB(A). With this fluctuation in noise levels, the Leq value might calculate to be 75 dB(A).

Habitable Room

A habitable room is defined as any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

Intrusive Noise

That noise which exceeds the existing ambient noise at a given location is termed an intrusive noise. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content as well as prevailing ambient noise level. An intrusive noise could be generated by a diesel truck, helicopter, construction equipment or a wide variety of other noise sources.

L percentile

L percentiles represent the A-weighted sound level exceeded for the identified percent of the sample time. For example, a value of 55 dB(A) L_{10} would mean that 55 dB(A) was exceeded 10 percent of the time. Other L percentiles commonly used include L50, L90, L99, etc.

Noise

Noise is any unwanted sound, or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying.

Noise Contours

The lines drawn around a noise source indicating constant or equal level of noise exposure from that source are termed noise contours. These lines are similar to the lines on a weather map indicating equal temperature.

Noise Sensitive Land Use

Noise sensitive land uses are land uses associated with indoor and/or outdoor human activities that may be subject to stress and/or significant interference from noise. They include residential (single and multi-family dwellings, mobile home parks, dormitories, and similar uses); transient lodging (including hotels, motels, and similar uses); hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care; and public or private educational facilities, libraries, churches, and places of public assembly.

Outdoor Living Area

Outdoor living area is a term used to define spaces that are associated with residential land uses and are typically used for passive recreational activities. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas, and storage areas associated with residential land uses.

Sound Level Meter

An instrument, including a microphone, and amplifier, and output meter, and frequency weighting networks for the measurement and determination of noise and sound levels is called a sound level meter.

PART 3 NOISE CHARACTERISTICS

Noise is most often defined as unwanted sound. Sound levels can be easily measured, but the variability in subjective and physical response to sound complicates the analysis of its impact on people. A basic understanding of how sound is measured and described is provided below and is important to a more complete understanding of the programs identified in the noise element.

Sound is created when an object vibrates and radiates part of its energy as acoustic pressure or waves through a medium such as air, water, or a solid. The ear, the hearing mechanism of humans and most animals, receives these sound pressure waves and converts them to neurological impulses which are transmitted to the brain for interpretation. The interpretation or perception of sound may be different from the actual sound: loud sounds may seem quiet and quiet sounds may seem loud. Sounds may be perceived as loud, soft, noisy, quiet and high- or low-pitched. These subjective terms are all relative and do not convey technical information about the sound.

There are two parameters that are used technically to describe simple sounds.

- Amplitude -- The amplitude of a sound is a measure of the pressure of force that a sound can exert. Subjectively, we say a sound is louder if it has a larger amplitude than another sound. Thus, the amplitude of sounds can be described either in measurable magnitude or in relative terms of loudness.

  Physically, sound pressure is measured and quantified in units of decibels (dB). The sound pressure scale is based on the logarithm of the square of the ratio of the sound pressure being measured to a standard reference pressure which is approximately the least sound pressure that people can perceive. Zero dB means the lowest level normally audible, but does not mean zero sound pressure.

- Frequency -- The unit of frequency, Hertz (Hz), means cycles per second and refers to the number of times that the acoustic pressure (amplitude) peaks for each sound. Subjectively, a sound that has more cycles per sound is higher pitched. High-pitched sounds are produced by a rapidly vibrating sound source and, conversely, low-pitched sounds are from a more slowly vibrating source.

  The human hearing system is not equally sensitive to sound at all frequencies and responds more dramatically to sounds with frequencies in the range of 20 Hz to 20,000 Hz. Twenty Hz is equivalent to 20 vibrations per second. Frequencies above 20,000 Hz or below 20 Hz are inaudible to humans and referred to as ultrasound or infrasound, respectively.

The A-weighted decibel sound level scale has been developed to measure sound in a similar manner to the way the human hearing system responds. The use of the A-weighted scale is often indicated by using the abbreviation "dB(A)" for expressing the units of the sound level quantities. Typical A-weighted sound levels measured for various sources are provided in Exhibit 1. For example, conversation at three feet is approximately 65 dB(A) and sound levels become intolerable and then painful at levels above 110 dB(A). A quiet urban daytime sound level is typically 50 dB(A). The public reaction to sound levels becomes more evident as sound levels increase. Sound levels below 50 dB(A) are generally accepted while complaints are possible at 70 dB(A).

Because sound levels are in logarithmic units, they cannot be added arithmetically. Table 1 indicates a shorthand method of adding sound levels. For example, 60 dB(A) + 60 dB(A) added logarithmically, on an energy basis, equals 63 dB(A), not 120 dB(A). Hence, a doubling of sound energy produces 3 dB(A) change in the measured sound pressure level. In the same vein, two sounds of 60 dB(A) and 70 dB(A) would logarithmically add to 70.4 dB(A). The previously discussed 3 dB(A) change represents a doubling of sound energy, but not a doubling in loudness. Loudness is a subjective interpretation. Generally, a 3 dB(A) change is not noticed, while a 5 to 10 dB(A) change is clearly noticeable. Due to nonlinearities in the mechanism of the human ear, a sound must be nearly 10 dB(A) higher than another to be judged twice as loud. It follows that a sound of 20 dB(A) is four times as loud, and 30 dB(A) is eight times as loud.

PUBLIC REACTION	NOISE LEVEL (dBA)	COMMON INDOOR NOISE LEVELS	COMMON OUTDOOR NOISE LEVELS
	110	Rock Band	
			Jet Flyover at 1000 ft.
LOCAL COMMITTEE ACTIVITY WITH INFLUENTIAL OR LEGAL ACTION	100	Inside Subway Train	Gas Lawn Mower at 3 ft.
LETTERS OF PROTEST	90	Food Blender at 3 ft.	Diesel Truck at 50 ft.
COMPLAINTS LIKELY	80	Garbage Disposal at 3 ft.	Noisy Urban Daytime
		Shouting at 3 ft.	
COMPLAINTS POSSIBLE	70	Vacuum Cleaner at 10 ft.	Gas Lawn Mower at 100 ft.
		Normal Speech at 3 ft.	Commercial Area
COMPLAINTS RARE	60		Heavy Traffic at 300 ft.
		Large Business Office	
	50	Dishwasher Next Room	Quiet Urban Daytime
ACCEPTANCE			
	40	Small Theater, Conference Room (Background)	Quiet Urban Nighttime
			Quiet Suburban Nighttime
		Library	
	30		
		Bedroom at Night Concert Hall (Background)	Quiet Rural Nighttime
	20		
		Broadcast and Recording Studio	
	10		
		Threshold of Hearing	
	0		

EXHIBIT 1

Common Noise Levels
and Public Reaction

City of Thousand Oaks

Source:Caltrans Noise Manual, California State Department of Transportation, March 1980,pg.I-1-4.

FORESITE

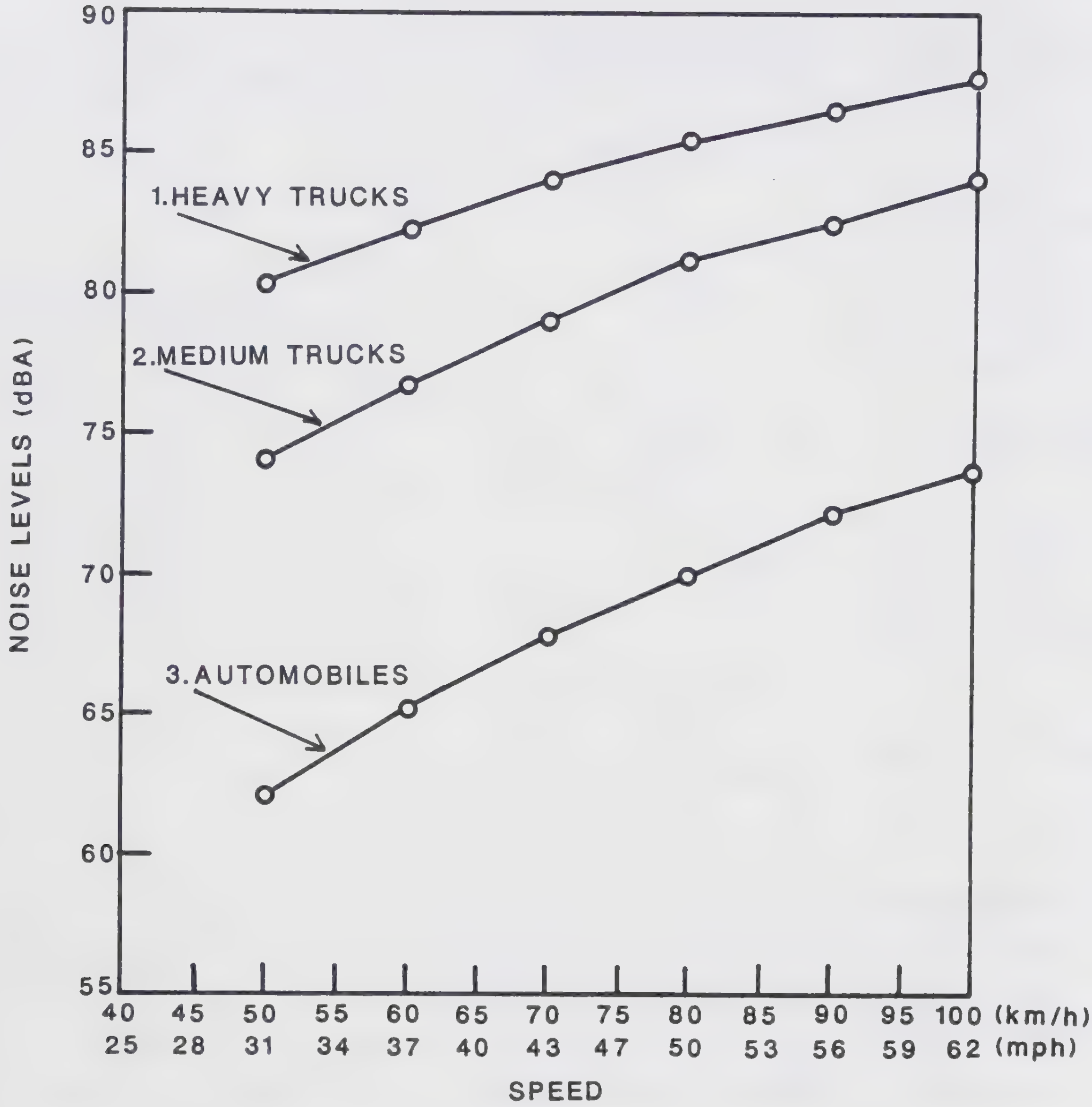
TABLE 1

DECIBEL ADDITION

Higher Noise Level Minus Lower Noise Level	Add to Higher Noise Level
0	3.0
1	2.5
2	2.1
3	1.8
4	1.5
5	1.2
6	1.0
7	0.8
8	0.6
9	0.5
10	0.4
12	0.3
14	0.2
16	0.1
greater than 16	0

The predominant noise source in a city is typically roadway traffic. Vehicle noise levels vary depending on type of vehicle, engine size, speed, tires, roadway grade, etc. Exhibit 2 provides reference noise levels for heavy trucks, medium trucks, and automobiles. Medium trucks are approximately 10 to 12 dB(A) louder than automobiles at all speeds. Heavy trucks are 4 to 6 dB(A) louder than medium trucks.

The three major components of vehicle noise are the tires, engine, and exhaust. Heavy truck noise contributions by component are shown in Exhibit 3. The exhaust system is the major source and also has the greatest height (more difficult to mitigate with barriers).



1. AUTOMOBILES: ALL VEHICLES WITH TWO AXLES AND FOUR WHEELS .

2. MEDIUM TRUCKS: ALL VEHICLES WITH TWO AXLES AND SIX WHEELS .

3. HEAVY TRUCKS: ALL VEHICLES WITH THREE OR MORE AXLES.

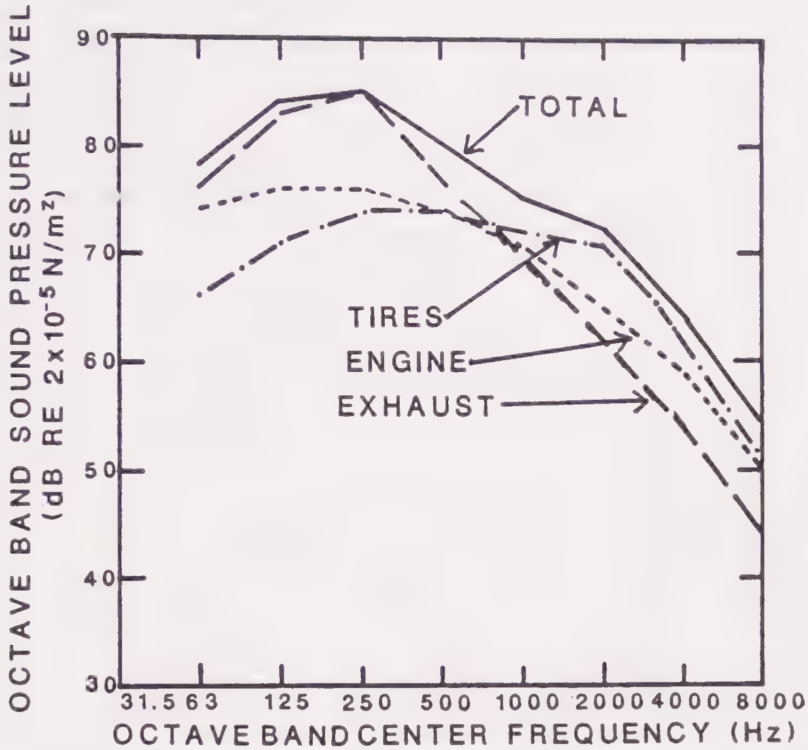
EXHIBIT 2

Reference Noise Levels at 50 Feet as a Function of Speed

City of Thousand Oaks

FORESITE

Source:U.S. Department of Transportation, Federal Highway Administration, FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108), December 1978



Hypothetical mixture of the three principal sources of truck noise. Noise levels will vary for different components in different trucks.

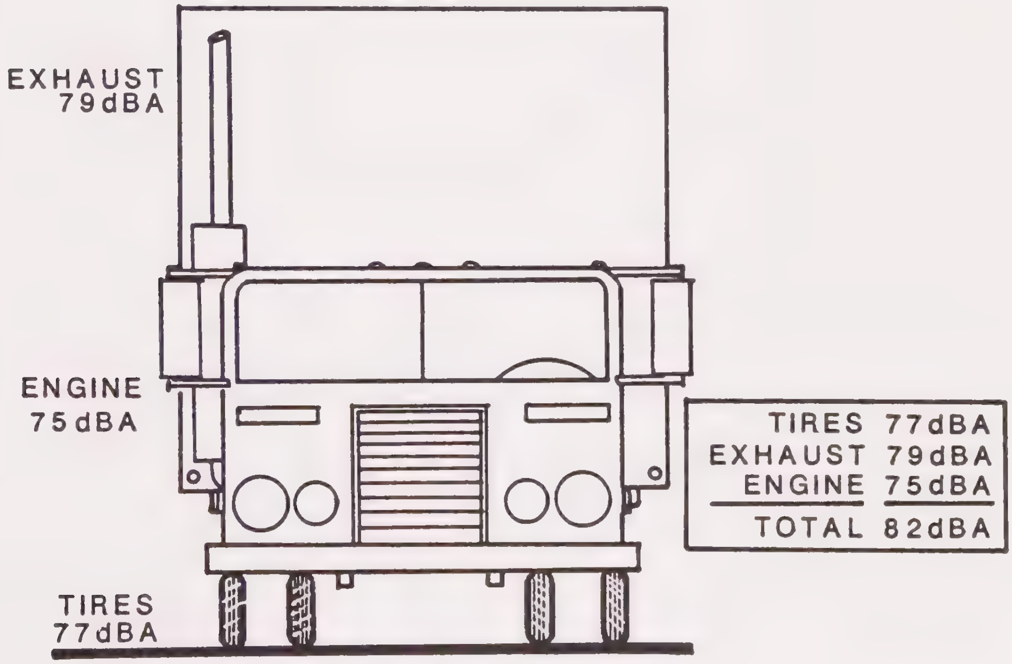


EXHIBIT 3

Heavy Truck Component Noise at 50 Feet

City of Thousand Oaks

FORESITE

Source: California Department of Transportation, Caltrans Noise Manual, March 1980.

As the distance to a noise source increases, the sound level diminishes. Sound waves are attenuated by both air and ground absorption. If the sound originates from a point source (such as an air conditioning unit), the rate at which the sound attenuates is 6 dB(A) per doubling of distance. Sound from a line source (a steady stream of vehicles) diminishes at 3 dB(A) per doubling of distance. Exhibit 4 graphically depicts the decrease in sound level with distance.

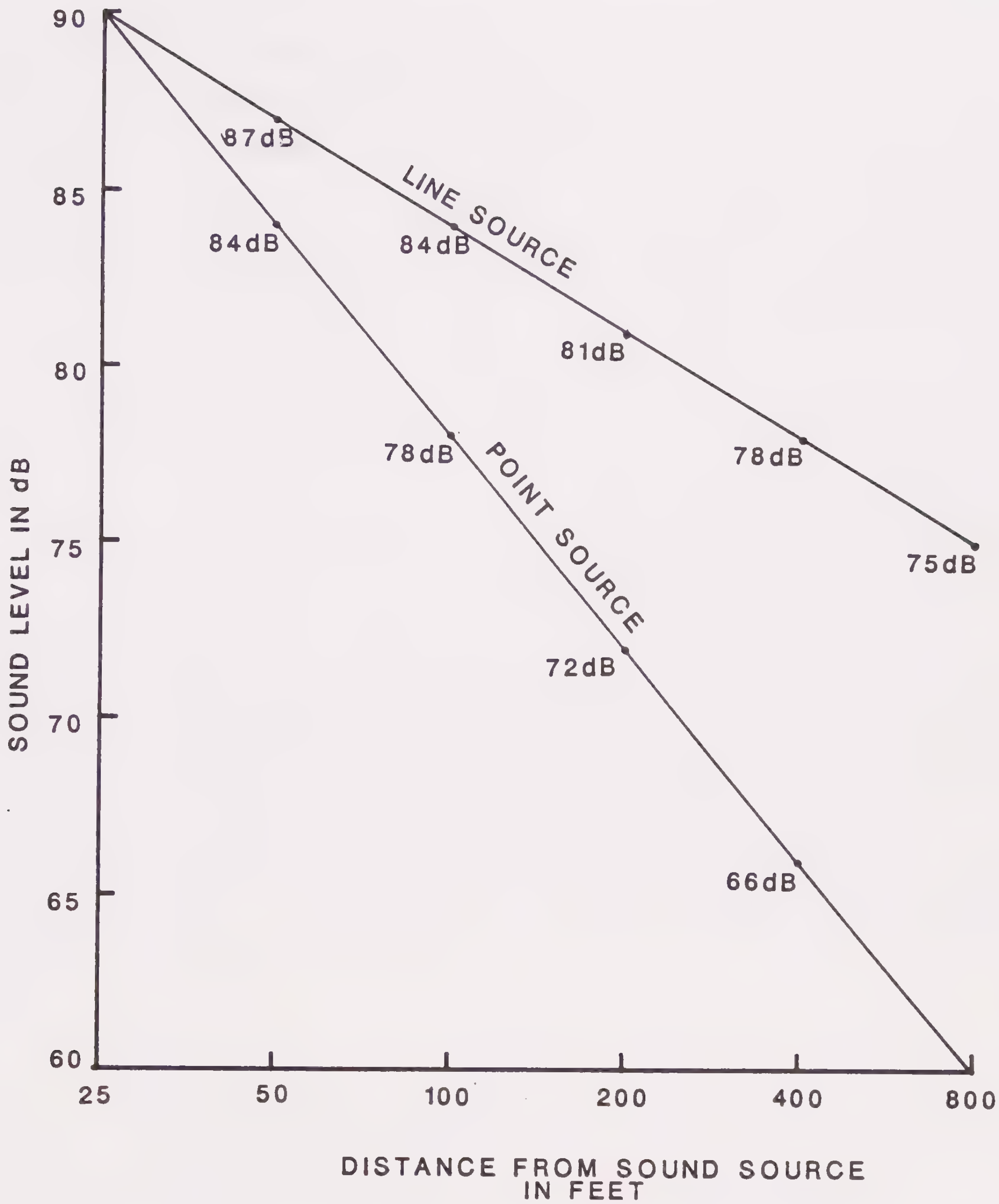


EXHIBIT 4
Sound Level Decrease
with Distance
City of Thousand Oaks

FORESITE

PART 4 NOISE CRITERIA

While the A-weighted decibel scale is often used to quantify the individual event sound level, and is related to subjective response ranking, psychoacousticians (scientists specializing in the effects of noise on people) have determined that the degree of annoyance response and other effects depend on a number of factors. Some of the factors (identified by researchers over the years) which affect our perception and cause us to categorize a sound as an annoyance or, in other words, as noise are:

- Magnitude of the event sound level in relation to the background (i.e., ambient) sound level.
- Duration of the sound event.
- Frequency of occurrence of events.
- Time of day events occur.

The federal and state governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and various other adverse physiological, psychological, and social effects associated with noise. The federal government specifically preempts local control of noise emissions from aircraft, railroads, and interstate highways, so as not to impose undue burden on interstate or foreign commerce.

4.1 FEDERAL STANDARDS

The federal government has adopted a number of standards and recommended noise criteria to protect people in both the working and home environments. The standards and criteria most applicable to the City of Thousand Oaks are discussed below. The federal agencies involved include: Department of Labor - noise standards for the workplace; Federal Highway Administration - design noise levels for federal highway projects; Department of Housing and Urban Development - maximum noise level standards for federally-assisted housing projects, and; Environmental Protection Agency - guidelines to adequately protect the public welfare.

A. Department of Labor

The first federal efforts regulating noise were issued by the Department of Labor in 1969 and established noise as an occupational health hazard. As a result, two legislative acts have been adopted that regulate noise from industrial fixed-point sources resulting in hearing loss. The Walsh Healey Public Contracts Act, as amended, includes provisions for occupational noise regulations. Failure by a corporation to comply with the established standards may result in the corporation's removal from a list of bidders eligible for federal contracts.

The second legislative action, the Occupational Safety and Health Act (OSHA) of 1970, set noise exposure standards as shown in Table 2 for all businesses engaged in interstate commerce.

TABLE 2

OSHA PERMISSIBLE NOISE EXPOSURE IN THE WORKPLACE

Duration-Hours Per Day	Sound Level dB(A)
8	90
6	92
4	95
3	97
2	100
1	105

Source: Department of Labor Occupational Noise Exposure Standard, Code of Federal Regulations, Title 29, Chapter XVII Part 1910, Subpart G, 36 FR10466, May 29, 1971, as amended and corrected through June 19, 1983.

B. Federal Highway Administration (FHWA)

The FHWA has established noise standards for various types of land use. The FHWA noise standards by land use category for use in the planning and designing of highways are shown in Table 3. These standards apply to federally funded highway projects, and are in terms of both Equivalent Noise Level (Leq) and L_{10}.

TABLE 3

FHA DESIGN NOISE LEVEL/LAND USE RELATIONSHIPS

Category	Leq[1]	L_{10}[2]	Location	Description of Land
A	57	60	Exterior	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need, i.e., amphitheaters, parks, and open space.
B	67	70	Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, and parks not included in Category A and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72	75	Exterior	Developed lands, properties, or activities not included in the above categories.
E	52	55	Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

1 Equivalent Noise Level.
2 Noise level exceeded ten percent of the time.

Source: Department of Transportation, Federal Highway Administration Highway Noise Control Standards and Procedures, Title 23, Code of Federal Regulations, Chapter 1, Subchapter J, Part 772, 38, FR 15953, June 19, 1973, as amended through May 29, 1979.

Exterior noise levels apply to outdoor areas which have regular human use and in which a lowered noise level would be beneficial. The noise level values need not be applied to areas having limited human use or where lowered noise levels would produce little benefit. The indoor level relates to indoor activities where no exterior noise-sensitive land use or activity is identified.

C. Department of Housing and Urban Development (HUD)

It is HUD's general policy to provide minimum national noise standards applicable to HUD programs to protect citizens against excessive noise in their communities and places of residence. HUD has adopted environmental criteria and standards for determining project acceptability and necessary mitigation measures to insure that activities assisted by HUD achieve the goal of a suitable living environment. By "activities assisted," HUD is referring to its various housing and urban development financial assistance programs.

HUD's overall goal is for exterior residential noise levels not to exceed 55 dB Ldn and for interior noise levels not to exceed 45 dB Ldn. However, as Table 4 indicates, for purposes of regulation and to meet other program objectives, exterior sound levels of 65 dB Ldn and below are acceptable and allowable. Projects within 65 to 75 dB Ldn require special environmental clearance and additional noise insulation. Projects with a 75 dB and greater require a submittal of an Environmental Impact Statement (EIS).

TABLE 4

HUD HOUSING SITE ACCEPTABILITY STANDARDS

Acceptability	Ldn	Special Approvals and Requirements
Acceptable	65 dB and less	None
Normally Unacceptable	65 dB to 75 dB	Special environment clearance and 5 dB additional attenuation for building with 65 to 70 dB Ldn and 10 dB additional attenuation for buildings within 70 to 75 dB Ldn.
Unacceptable	75 dB and greater	Submittal of Environmental Impact Statement.

Source: Department of Housing and Urban Development Environmental Criteria and Standards, Title 24, Code of Federal Regulations, Part 51, issued at 44 FR 40860, July 12, 1979; amended by 49 FR 880, January 6, 1984.

D. Environmental Protection Agency (EPA)

In 1972, Congress enacted the Noise Control Act. This act authorized the EPA to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels) as shown in Table 5. The EPA cautions that their identified levels are not standards because they do not take into account the cost or feasibility of the levels. For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an Leq (24) of 70 dB. The "(24)" signifies an Leq duration of 24 hours. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels do not exceed 55 dB(A) and 45 dB(A), respectively.

TABLE 5

SUMMARY OF EPA NOISE LEVELS IDENTIFIED AS REQUISITE TO PROJECT PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY

Effect	Level	Area
Hearing Loss	Leq (24) $\leq$70 dB	All areas.
Outdoor activity interference and annoyance	Ldn $\geq$55 dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	Leq (24) $\leq$55 dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	Leq $\leq$45 dB	Indoor residential areas.
	Leq (24) $\leq$45 dB	Other indoor areas with human activities such as schools, etc.

Source: U.S. Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." March 1974.

The noise effects associated with an outdoor Ldn of 55 dB are summarized in Table 6. At 55 dB Ldn, 95 percent sentence clarity (intelligibility) may be expected at 3.5 meters, and no community reaction. However, 1 percent of the population may complain about noise at this level and 17 percent may indicate annoyance.

TABLE 6

SUMMARY OF HUMAN EFFECTS IN AREAS EXPOSED TO 55 dB CNEL

Type of Effect	Magnitude of Effect
Speech - Indoors	100 percent sentence intelligibility (average) with a 5 dB margin of safety.
- Outdoors	100 percent sentence intelligibility (average) at 0.35 meters.
	99 percent sentence intelligibility (average) at 1.0 meters.
	95 percent sentence intelligibility (average) at 3.5 meters.
Average Community Reaction	None evident; 7 dB below level of significant complaints and threats of legal action and at least 16 dB below "vigorous action" (attitudes and other non-level related factors may affect this result).
Complaints	1 percent dependent on attitude and other non-level related factors.
Annoyance	17 percent dependent on attitude and other non-level related factors.
Attitudes Towards Area	Noise essentially the least important of various factors.

Source: U.S. Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," March 1974.

4.2 STATE OF CALIFORNIA STANDARDS AND GUIDELINES

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, freeway noise affecting classrooms, noise insulation, occupational noise control and airport noise. The state has also developed land use compatibility guidelines for community noise environments. The applicable standards and guidelines for the city are discussed.

A. Motor Vehicles

The California Motor Vehicle Code sets operational noise limits for motor vehicles (Section 23130), requires an adequate muffler in constant operation and properly maintained (Section 27150), prohibits the sale or installation of a motor vehicle exhaust system unless it meets regulations or standards (Section 27150.1), prohibits the modification of the exhaust system to amplify or increase the noise above that of the original system (Section 27151), prohibits the sale of new vehicles exceeding the noise limits (Section 27160), and sets noise limits for the operation of off-highway motor vehicles (Section 38280) as shown in Table 7. Police and traffic officers generally enforce this code.

B. Freeway Noise Affecting Classrooms

The California law on freeway noise affecting classrooms is designed to mitigate noise impacts to existing classrooms, libraries, multi-purpose rooms, and spaces used for pupil personnel services of a public or private elementary or secondary school. State funded noise abatement programs are required when freeway traffic or the construction of the freeway exceeds 55 dB(A) L_{10} or 52 dB(A) Leq. The temporary or permanent noise abatement program may include installing acoustical materials, eliminating windows, installing air conditioning, or constructing sound buffer structures. Further explanations of this law are found in California Streets and Highway Code, Division 1, State Highways, Chapter 1, Administration, Article 6; Section 216, as amended.

TABLE 7

CALIFORNIA MOTOR VEHICLE NOISE LIMITS FOR VEHICLES

Sale of New Vehicles	Date of Manufacture	dB(A) Value at at 50 Feet
Motorcycles	Before 1970	92
Motorcycles, other than motor-driven cycles	After '69, Before '73	88
	After '72, Before '75	86
	After '74, Before 86	83
	After '85	80
Vehicle with a gross vehicle weight of 6,000 lbs. or more	After '67, Before '73	88
	After '72, Before '75	86
	After '74, Before '78	83
	After '77	80
Any other motor vehicle	After '67, Before '73	86
	After '72, Before '75	84
	After '75	80
Noise level limits for the operation of off-highway motor vehicles	Before '73	92
	After '72, Before '75	88
	After '74	86

Operation of Vehicle	35 or Less[1]	45 or Less[2]	More than 45[2]
Any motor vehicle with a manufacturer's gross vehicle weight rating of 6,000 pounds or more and any combination of vehicles towed by such motor vehicle.	82 dB(A)	--	--
Any motor vehicle with a manufacturer's gross vehicle weight rating of more than 10,000 pounds and any combination of vehicles towed by such a motor vehicle.	--	86 dB(A)	90 dB(A)
Any motorcycle other than a motor driven cycle.	77 dB(A)	82 dB(A)	86 dB(A)
Any other motor vehicle and any combination of vehicles towed by such motor vehicle.	74 dB(A)	76 dB(A)	82 dB(A)

1. On streets with a grade not exceeding plus or minus 1 percent.
2. On any street.

Source: Excerpts from the California Motor Vehicle Code.

C. Noise Insulation Standards

The California Sound Transmission Control Standards are found in California Administrative Code, Title 24, Building Standards, Chapter 2.5 as adopted March 1, 1986. The purpose of the standards is to establish minimum noise insulation performance standards to protect persons within new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings.

The standards state that interior noise levels with windows closed attributable to exterior sources shall not exceed an annual noise level of 45 dB CNEL in any habitable room. In addition, residential buildings or structures within a 60 dB CNEL from airport, vehicular, or industrial noise sources shall require an acoustical analysis showing that the proposed building has been designed to limit intruding noise to the allowable 45 dB CNEL interior noise level.

D. Airport Noise Standard

California Administrative Code, Title 21, Public Works, Chapter 25, Division of Aeronautics, Subchapter 6, noise standards require that land use be compatible within a criterion CNEL contour for airports. While helicopters are not specifically mentioned, it is the intent of this standard to also be applicable to heliports and helipads. One objective of this standard is to create an urban development pattern in which all the land included within the criterion CNEL contour is devoted to either airport or nonsensitive land uses as defined in the standards.

Currently the standard is 70 dB CNEL. These standards become more restrictive on January 1, 1986, at which time they do not permit land use incompatibilities within an airport's 65 dB CNEL contour.

Incompatible land uses including:

- Single-family dwellings.
- Multiple-family dwellings.
- Trailer parks.
- Schools of standard construction.
- Hospitals.

Compatible land uses include:

- Agricultural.
- Airport property.
- Industrial property.
- Commercial property.
- Property subject to avigation easement for noise.
- Zoned open space.
- High rise apartments in which adequate protection against exterior noise has been included in the design and construction, together with a central air conditioning system. Adequate protection means the noise reduction (exterior to interior) shall be sufficient to assure that interior CNEL in all habitable rooms does not exceed 45 dB during aircraft operations.

E. Occupational Noise Control Standards

California Occupational Noise Control Standards are found in California Administrative Code, Title 8, Industrial Relations, Chapter 4, as revised and effective September 28, 1984. A summary of the permissible noise exposure at a workplace is shown in Table 8.

TABLE 8

CALIFORNIA OCCUPATIONAL NOISE CONTROL STANDARDS

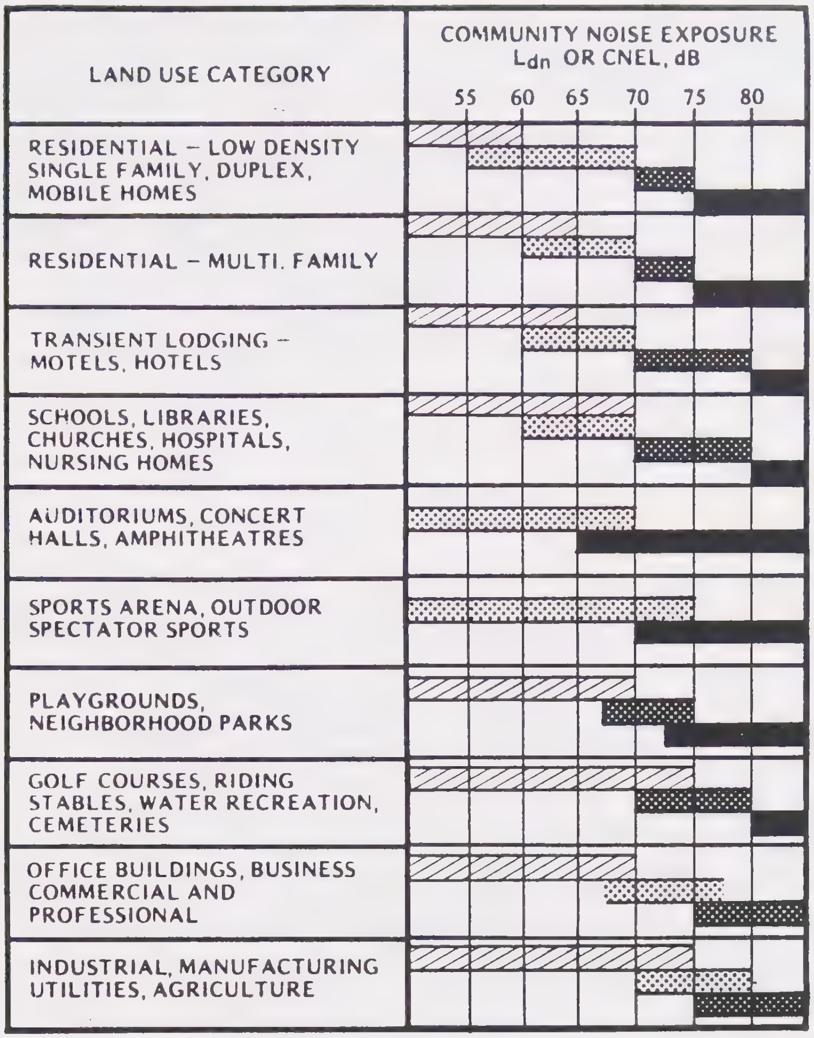
Sound Level dB(A)	Permitted Hours of Exposure Per Weekday
90	8
95	4
100	2
105	1
110	0.5

Source: California Administrative Code, Title 8, Industrial Relations, Chapter 4, as revised and effective September 28, 1984.

F. Land Use Compatibility Guidelines

The State Office of Noise Control in "Guidelines for the Preparation and Content of Noise Elements of the General Plan," February 1976, provided guidance for the

acceptability of projects within specific Ldn/CNEL contours. These land use compatibility guidelines are provided in Exhibit 5. Residential uses are normally unacceptable in areas exceeding 70 dB CNEL and conditionally acceptable within 60 to 70 dB CNEL. Schools, libraries, churches, hospitals, and nursing homes are treated as noise sensitive land use requiring acoustical studies within areas exceeding 60 dB CNEL. However, the state stresses that these guidelines can be modified to reflect communities sensitivity to noise.



INTERPRETATION

NORMALLY ACCEPTABLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE

New construction or development should generally not be undertaken.

CONSIDERATIONS IN DETERMINATION OF NOISE–COMPATIBLE LAND USE

A. NORMALIZED NOISE EXPOSURE INFORMATION DESIRED

Where sufficient data exists, evaluate land use suitability with respect to a "normalized" value of CNEL or L_{dn}. Normalized values are obtained by adding or subtracting the constants described in Table 1 to the measured or calculated value of CNEL or L_{dn}.

B. NOISE SOURCE CHARACTERISTICS

The land use-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in Community Noise Exposure Areas greater than 65 dB should be discouraged and considered located within normally unacceptable areas.

C. SUITABLE INTERIOR ENVIRONMENTS

One objective of locating residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL of L_{dn}. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

D. ACCEPTABLE OUTDOOR ENVIRONMENTS

Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. When this is the case, more restrictive standards for land use compatibility, typically below the maximum considered "normally acceptable" for that land use category, may be appropriate.

EXHIBIT 5

Land Use Compatability

City of Thousand Oaks

FORESITE

Source: California Department of Health, Guidelines for the Preparation and Content of Noise Elements of The General Plan, February, 1976.

PART 5. NOISE ENVIRONMENT

5.1 EXISTING CONDITIONS

The existing noise environment was documented through both a community noise survey and computer generated noise contours. The noise survey identified existing noise levels at specific locations within the city while the computer analysis predicted existing and future roadway noise levels.

A. Community Noise Survey

A community noise survey was conducted on June 12, 13, and 20, 1985 to document the existing noise environment. Noise monitoring locations were selected by the Noise Element Advisory Committee. Daytime noise measurements between the hours of 10:00 a.m. and 7:00 p.m. were conducted at 21 locations within the city and its planning area. Additional nighttime measurements were recorded at six of the daytime locations to determine the reduction in noise levels after 10:00 p.m. The noise measurement locations are identified in Exhibit 6 and are representative samples of areas along U.S. 101 and Route 23, developed residential areas, undeveloped areas, and areas of mixed land use. Noise measurements were conducted in undeveloped future growth areas to establish a baseline noise level. The noise measurement survey data forms for each location along with a site photo are separately bound. The noise measurement results should be used as a guideline or indication of noise levels within the community.

The daytime noise measurements are shown in Table 9. The Lmax is the highest sound level measured during the sampling period of at least 15 minutes for each location. The L_{10} represents the sound level which is exceeded 10 percent of the sampled time period. The same relationship holds for the L_{50} and L_{90}, respectively. The L_{10} value is considered the "near peak", the L_{50} the "median", and the L_{90} the "residual" or background noise level. The Leq is the level of a steady sound which has the same A-weighted sound energy as the time varying sound.

Daytime maximum noise levels ranged from 62 to 84 dB(A). Vehicles on adjacent roadways were the source of the higher noise levels. The median noise levels or levels in which one-half of the measurements were higher and one-half were lower ranged from 41 to 65 dB(A). A 50 dB(A) value would be considered typical of quiet urban areas. The L_{90} or background level ranged from 40 to 61 dB(A). The Leq ranged from 50.5 to 67.7 dB(A).

EXHIBIT 6

Noise Measurement Site Locations

City of Thousand Oaks

FORESITE

TABLE 9

DAYTIME NOISE MEASUREMENTS BY SITE

Site No.	Closest Intersection	Lmax[1]	L_{10}[2]	L_{50}[3]	L_{90}[4]	Leq[5]
1	Portrero Rd./Pinehill Ave.	77	52	41	40	56.4
2	Rancho Rd./Pygmalian	62	55	52	51	52.9
3	Potrero Rd./Trafalgor Pl.	68	54	41	40	51.1
4	Sunset Hills Blvd./Ave. Amaranto	70	53	46	43	50.5
5	La Jolla Dr./Encino Vista	75	57	55	54	56.7
6	Skyline Dr./Crescent Way	64	55	51	50	53.5
7	Janss Rd./El Monte Dr.	78	61	56	51	58.9
8	Moorpark Rd./Ave. De Los Flores	73	61	55	49	57.6
9	Lynn Rd./Ave. De Los Arboles	82	68	62	55	65.2
10	Big Sky Dr./Ave. De Los Arboles	65	54	43	40	50.5
11	Rancho Conejo/Lawrence Ave.	67	57	53	50	54.7
12	Lynn Rd./Hillcrest Dr.	79	72	65	51	67.7
13	Michael Dr./Lupe Ave.	77	58	49	45	52.1
14	Olsen Rd./Campus Dr.	70	63	56	44	58.9
15	Lynn Rd./La Cam Rd.	71	60	50	42	55.5
16	Wilbur Rd./St. Charles Dr.	73	62	56	49	58.1
17	Agoura Rd./Village Glen	84	66	60	55	63.3
18	Valley Spring/Lakeview Cyn.	70	54	45	40	51.1
19	Citation Way/Hillcrest Dr.	72	54	50	48	52.9
20	Skyline Dr./Willow Ln.	81	55	45	42	57.5
21	Lynn Rd./Janss Rd.	76	67	60	53	63.5

1. Lmax is the maximum sound level.
2. L_{10} is the sound level exceeded 10 percent of the noise measurement duration.
3. L_{50} is the sound level exceeded 50 percent of the noise measurement duration.
4. L_{90} is the sound level exceeded 90 percent of the noise measurement duration. It is also considered the background noise level.
5. Leq is an average of all the sounds occurring over the measurement period.

Nighttime noise measurements are shown in Table 10. Vehicles are again the major noise contributors. The Lmax values are lower than the daytime Lmax values reflecting infrequent and less noisy vehicular traffic. The Leq values were substantially lower and ranged from 39.0 to 54.0 dB(A). This again reflects the lack of a large number of noise sources as found during daytime noise measurements.

TABLE 10

NIGHTTIME NOISE MEASUREMENTS BY SITE

Site No.	Lmax	L_{10}	Leq
2	53	50	48.0
4	65	44	41.0
5	56	49	48.0
8	64	57	54.0
13	50	41	39.0
19	51	47	43.0

1. Lmax is the maximum sound level.
2. L_{10} is the sound level exceeded 10 percent of the noise measurement.
3. Leq is an average of all the sound levels occurring over the measurement period.

The day and night measurements are compared in Table 11. The Lmax value decreased approximately 12 dB(A) during the nighttime. The L_{10} or peak noise levels also decreased by at least 12 dB(A). The nighttime Leq values diminished at night with only Site 8 exceeding 48.0 The Leq value of 54.0 for Site 8 reflected traffic at Thousand Oaks High School and on Moorpark Road.

TABLE 11

COMPARISON OF DAY AND NIGHT NOISE LEVELS[1]

Time Period	Lmax[2]	L_{10}[3]	Leq[4]
Day	62-77	53-61	50.5 - 57.6
Night	50-65	41-57	39.0 - 54.0

1. Includes only Sites 2, 4, 5, 8, 13, and 19 where both day and night measurements were conducted.
2. Lmax is the maximum sound level.
3. L_{10} is the sound level exceeded 10 percent of the noise measurement duration.
4. Leq is an average of all the sound levels occurring over the measurement period.

The noise measurement locations were divided into four zones of generally consistent land use and similar noise environments for discussion. The four zones are along U.S. 101 and Route 23, developed residential areas, areas of mixed land use, and undeveloped areas. Each of these areas is summarized below.

Along U.S. 101 and Route 23

Six measurement locations were characterized as being subject to noise originating from U.S. 101 and Route 23. The daytime L_{10} and Leq values for these sites are shown in Table 12. The L_{10} value for five of the sites was very similar and ranged from 54 to 57 dB(A). Site 12 had a much higher L_{10} reflecting its short distance from U.S. 101 (approximately 100 feet) and traffic on Hillcrest Drive. The Leq values were also very similar with the exception of Site 12.

TABLE 12

U.S. 101 AND ROUTE 23
NOISE MEASUREMENTS BY SITE

Site Number	L_{10} [1]	Leq [2]
2	55	52.9
5	57	56.7
6	55	53.5
12	72	67.7
19	54	52.9
20	55	57.5

1. L_{10} is the sound level exceeded 10 percent of the noise measurement duration.
2. Leq is an average of all the sound levels occurring over the measurement period.

Developed Residential Areas

Noise levels in residential areas were characterized by location 4, 7, 9, 10, 13, and 21. The noise levels vary substantially depending on whether the location was near a major roadway or screened from traffic noise. The noise levels are shown in Table 13 with the L_{10} ranging from 53 to 68 dB(A) and the Leq values ranging from 50.5 to 65.2.

TABLE 13

DEVELOPED RESIDENTIAL AREA
NOISE MEASUREMENTS BY SITE

Site Number	L_{10} [1]	Leq [2]
4	53	50.5
7	61	58.9
9	68	65.2
10	54	50.5
13	58	52.1
21	67	63.5

1. L_{10} is the sound level exceeded 10 percent of the noise measurement duration.
2. Leq is an average of all the sound levels occuring over the measurement period.

Mixed Land Use

The mixed land use category included areas of residential, commercial, public, and undeveloped uses. The L_{10}, see Table 14, ranged from 54 to 66 dB(A) and was caused by adjacent roadway traffic. The Leq values ranged from 51.1 to 63.3 dB(A).

TABLE 14

MIXED LAND USE
NOISE MEASUREMENTS BY SITE

Site Number	L_{10}[1]	Leq[2]
8	61	57.6
17	66	63.3
18	54	51.1

1. L_{10} is the sound level exceeded 10 percent of the noise measurement duration.
2. Leq is an average of all the sound levels occurring over the measurement period.

Undeveloped Areas

Six locations were typical of undeveloped sites within the City of Thousand Oaks and its planning area. The Leq values ranged from 51.1 to 58.9 dB(A) and described areas of lower levels of traffic, see Table 15.

TABLE 15

UNDEVELOPED AREA
NOISE MEASUREMENTS BY SITE

Site Number	L_{10}[1]	Leq[2]
1	52	56.4
3	54	51.1
11	57	54.7
14	63	58.9
15	60	55.5
16	62	58.1

1. L_{10} is the sound level exceeded 10 percent of the noise measurement duration.
2. Leq is an average of all the sound levels occurring over the measurement period.

Summary

The range of noise levels by similar noise environments are summarized in Table 16. As expected the lowest L_{10} and Leq values were in the undeveloped areas. The upper range of the L_{10} and Leq values were substantially lower than for any of the other noise environments. This primarily reflects a lack of traffic or other noise sources in the area. The highest L_{10} and Leq values were along the U.S. 101 and Route 23. In general, residential uses and other noise sensitive land uses located along U.S. 101 and Route 23 and not shielded by noise walls or topography will be subjected to annoying diesel truck traffic (see Exhibit 3, page 12). The residential noise measurement locations near major roadways contributed to the high end of the L_{10} and Leq values for developed residential areas. Therefore, while the residential sites have lower L_{10} and Leq values than the mixed land use category they also have a greater range.

TABLE 16

RANGE OF L_{10} AND LEQ VALUES BY NOISE ENVIRONMENT

Noise Environment	L_{10}[1]	Leq[2]
Along U.S. 101 and Route 23	54-72	52.9-67.7
Developed Residential	53-68	50.5-65.2
Mixed Land Use	54-66	51.1-63.3
Undeveloped	52-62	51.1-58.9

1. L_{10} is the sound level exceeded 10 percent of the noise measurement duration.
2. Leq is an average of all the sound levels occurring over the measurement period.

B. Noise Contours for City of Thousand Oaks

Background

The noise element contains both 60 and 65 dB CNEL contours for transportation noise sources including U.S. 101, Route 23, and major roadways. There are no

aviation facilities or rail lines within the city and therefore no noise contours were generated for these types of noise sources.

A 65 dB CNEL level describes an area as having a time-average constant sound level of roughly 65 dB(A) even though the area would experience individual sound events higher and lower than 65 dB(A). CNEL provides a common measure for a variety of differing noise environments. Thus, the same CNEL can describe both an area with very few high noise events and an area with many low level events.

CNEL values can be useful in comparing noise environments and indicating the potential degree of adverse noise impacts. However, the CNEL scale has limitations in its usefulness through averaging the sound event levels over a 24-hour period and possibly obscuring the periodic high noise levels of individual events and their possible adverse effects. In recognition of this limitation, the Environmental Protection Agency (EPA) has adopted maximum single event noise impact levels for sources such as buses, garbage trucks, and railroad equipment.

Note that CNEL is not a measure but a computation of measured sound levels. People do not "hear" CNEL, but respond to the sound levels of individual events or noise sources. People may integrate over long term intervals (daily, weekly, etc.) their response to noise and make subjective judgments about the "quality" of the noise environment.

The noise contours represent lines of equal noise exposure (see Exhibit 7), just as the lines on a weather map indicate equal temperature or atmospheric pressure. The contours provide a visualization of estimates of sound level. Land forms and man-made structures have very complex effects on sound transmission and on noise contours. Generally barriers between a source and receiver absorb and/or reflect noise resulting in a quieter environment. Where barriers or land forms do not interrupt the noise transmission path from source to receiver, the contours prove to be good estimates of the average noise level. In areas where barriers or land forms interrupt the sound transmission, the noise contours overestimate the extent to which a source intrudes into the community. Unfortunately, it is virtually impossible for the Noise Element to analyze each roadway segment of the city for barrier noise attenuation. Therefore, where specific projects are proposed within noise impacted areas, an acoustical analysis should be completed to evaluate the noise reduction provided by any barriers to the noise path.

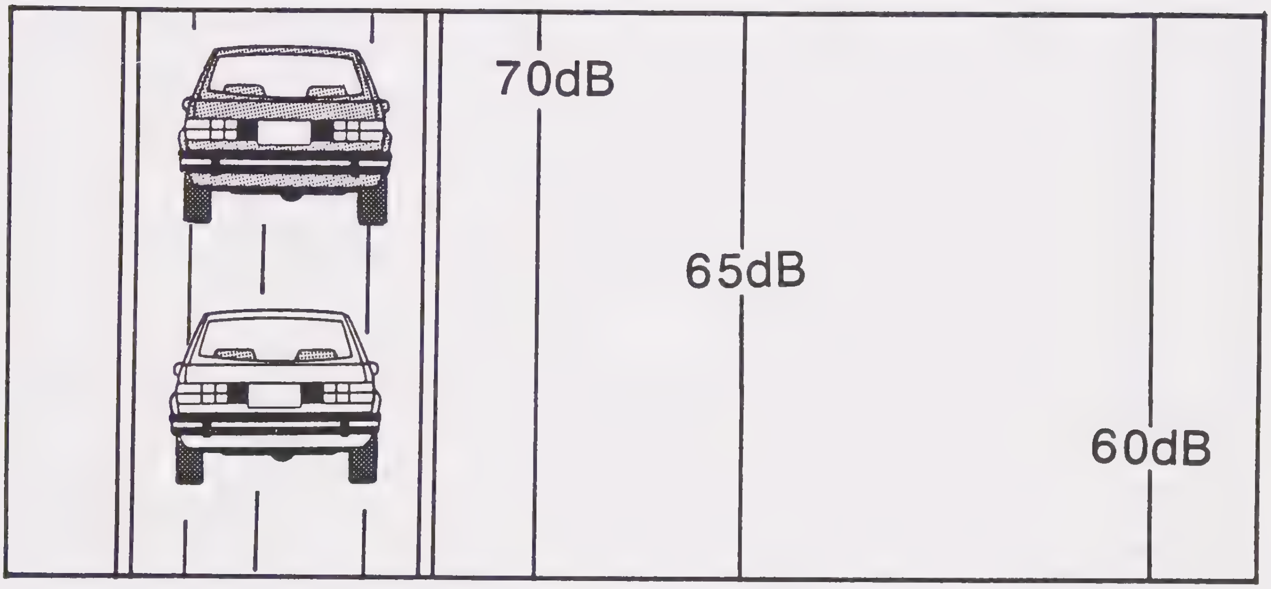


EXHIBIT 7
Example of Noise Contours
City of Thousand Oaks

FORESITE

CNEL values have been shown to be closely related to, and often within, 1 dB of Ldn values, a noise metric commonly used by federal agencies. The Ldn methodology does not weight sound events occurring between 7 p.m. and 10 p.m.

Computations

The City of Thousand Oaks roadway noise contours were generated with the Federal Highway Administration's Highway Traffic Noise Prediction Model, U.S. Department of Transportation (1978). This model was modified to generate CNEL values. Model input data included existing and projected average daily traffic levels; day/evening/night percentages of autos, medium and heavy trucks; vehicle speeds; ground attenuation factors (worst case hard site conditions were assumed for all roadways except U.S. 101 and Route 23 where topography and field noise measurements indicated that soft site conditions were more applicable); and roadway widths. The average daily traffic assumptions and distances to the roadway 60 and 65 dB CNEL contours for 1985 and 2005 are provided in Table 17.

Noise contours for the existing major transportation noise sources are shown in Exhibit 8. Both 60 and 65 dB CNEL contours are provided for U.S. Highway 101, Route 23, and primary and secondary roadway. The noise contours represent unmitigated conditions, except for U.S. 101 and Route 23 where noise walls and terrain were considered. Therefore, on roadways where walls, berms, or structures block the noise path, the contours overestimate the noise impact.

The estimated population within each CNEL zone is provided in Table 18. There are approximately 3,450 residents within the city exposed to noise levels exceeding 65 dB CNEL. Major roadways throughout the city are responsible for over 47 percent, 1,625, of the residents impacted by 65 dB CNEL and greater. U.S. 101 and Route 23 impact almost an equal number of residents within the 65 dB CNEL and greater. A substantially greater number of residents live within the 60-65 dB CNEL.

TABLE 17

1985 AND 2005 DAILY TRAFFIC AND dB CNEL CONTOURS BY ROADWAY
(Refer to Exhibits 8 and 9 for graphic display)

Roadway	Average Daily Traffic[b]		Distance in Feet to dB CNEL Contour[a]			
			1985		2005	
	1985	2005	60 dB	65 dB	60 dB	65 dB
U.S. Highway 101						
City limits to Rancho Conejo Blvd.	92,000	94,000	1,022	478	1,038	485
City limits to Rancho Conejo Blvd. (6' wall)	92,000	94,000	415	205	425	210
City limits to Rancho Conejo Blvd. (10' wall)	92,000	94,000	325	120	325	120
Rancho Conejo Blvd. to Rancho Road	116,800	140,700	1,166	544	1,319	615
Rancho Conejo Blvd. to Rancho Road (10' wall)	116,800	140,700	355	120	420	180
Rancho Conejo Blvd. to Rancho Road (12' wall)	116,800	140,700	310	120	360	125
Rancho Road to city limits	113,000	116,600	1,140	532	1,166	544
Rancho Road to city limits (6' wall)	113,000	116,600	460	225	475	230
Route 23						
U.S. 101 to Avenue De Los Arboles	43,500	55,000	606	287	707	333
Ave De Los Arboles to Olsen Road	32,500	42,500	500	239	596	282
Olsen Road to city limits	18,000	28,000	340	168	453	218
Agoura Road						
Westlake Blvd. to city limits	16,000	30,000	350	115	654	209
Avenue De Los Arboles						
Westlake Boulevard to Erbes Road	4,000	21,500	<50	<50	469	149
Erbes Road to Oakbrook	11,000	26,000	324	111	760	244
Oakbrook to Route 23	16,000	26,000	469	154	760	244
Route 23 to Avenue De Las Plantas	21,000	19,000	331	107	300	97
Avenue De las Plantes to Mountcleff Blvd.	13,000	16,000	206	69	252	83
Montcleff Blvd. to Velarde Drive	7,430	10,000	120	<50	159	<50
Ave De Las Flores						
Lynn Road to Young Avenue	5,250	9,500	86	<50	151	<50
Borchard Road						
Reino Road to Wendy Drive	8,500	10,400	187	64	228	76
Wendy Dr. to U.S 101	16,500	23,800	360	116	519	165
Camino Dos Rios						
Wendy Drive to Marion Street	9,200	12,800	145	<50	201	65
Marion Street to Lawrence Drive	<4,000	8,500	<50	<50	136	<50

a The distances are from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.

b Based on data provided by City Traffic Engineer, September 1986.

N/A Not available.

TABLE 17 (continued)

Roadway	Average Daily Traffic[b] 1985	Average Daily Traffic[b] 2005	1985 60 dB	1985 65 dB	2005 60 dB	2005 65 dB
			Distance in Feet to dB CNEL Contour[a]			
Conejo Blvd.						
Thousand Oaks Blvd. to Hillcrest Drive	6,500	N/A	<50	<50	--	--
De Havilland Drive						
Hillcrest Drive to city limits	5,400	N/A	<50	<50	--	--
Duesenburg Drive						
Hillcrest Drive to Thousand Oaks Blvd.	6,500	N/A	<50	<50	--	--
Erbes Road						
Sunset Hills Blvd. to Pederson Road	4,700	7,000	107	<50	156	<50
Pederson Road to Avenue De Los Arboles	8,200	10,000	181	65	220	76
Avenue De Los Arboles to Hillcrest Drive	10,233	11,600	224	75	264	83
Hillcrest Drive to Thousand Oaks Blvd.	7,600	15,000	166	53	327	103
Gainsborough Road						
Camino Flores to Lynn Road	5,300	14,000	57	<50	105	<50
Lynn Road to Moorpark Road	6,150	9,000	100	<50	143	<50
Hampshire Road						
Thousand Oaks Blvd. to Townsgate Road	23,000	21,500	673	217	629	203
Townsgate Road to Westlake Blvd.	15,000	20,000	327	105	436	139
Hillcrest Drive						
Lawrence Drive to Rancho Conejo Blvd.	9,000	12,600	154	77	191	93
Rancho Conejo Blvd. to De Havilland Drive	8,700	15,000	191	65	176	85
De Havilland Drive to Ventu Park Road	1,400	18,500	50	50	202	96
Ventu Park Road to Lynn Road	9,800	21,700	286	91	272	129
Lynn Road to Moorpark Road	11,500	30,500	341	107	929	293
Moorpark Road to Duesenberg Drive	9,080	9,500	102	<50	84	<50
Duesenberg Drive to Westlake Blvd.	5,400	7,000	61	<50	68	<50
Hodencamp Road						
Wilbur Road to Hillcrest Drive	7,300	N/A	118	<50	--	--
Kanan Road						
Westlake Blvd. to east city limits	<4,000	10,000	<50	<50	109	<50

a The distances are from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
N/A Not available.

TABLE 17 (continued)

Roadway	Average Daily Traffic[b] 1985	Average Daily Traffic[b] 2005	Distance in Feet to dB CNEL Contour[a] 1985 60 dB	1985 65 dB	2005 60 dB	2005 65 dB
Janss Road						
Lynn Road to Dover Avenue	7,550	8,000	121	<50	128	<50
Dover Avenue to Moorpark Road	13,000	15,000	206	69	237	78
Moorpark Road to Route 23	20,500	20,000	323q	104	101	315
Route 23 to El Monte	9,600	10,000	153	<50	159	<50
El Monte to Erbes Road	5,600	8,000	88	<50	126	<50
Kimber Drive						
Knollwood Dr. to Reino Road	4,300	11,400	<50	<50	167	50
Reino Rd. to Wendy Drive	5,900	11,000	77	<50	115	56
Lakeview Canyon Road						
Agoura Road to Thousand Oaks Blvd.	6,200	32,500	137	<50	708	225
Thousand Oakd Blvd. to Valley Springs Drive	--	15,000	--	--	327	104
Lynn Road						
Starfire Avenue to Avenue De Las Arboles	8,300	10,000	245	86	295	100
Avenue De Las Arboles to Gainsborough	14,000	17,000	410	134	498	161
Gainsborough to U.S. 101	26,000	38,160	759	241	1,114	353
U.S. 101 to Green Meadow Avenue	12,000	31,000	352	118	906	289
Green Meadow Avenue to Wendy Drive	5,325	25,200	156	<50	736	233
Wendy Drive to Reino Road	N/A	23,000	--	--	672	215
McCloud Avenue						
St. Charles Drive to Hillcrest Drive	4,900	N/A	54	<50	--	--
Michael Drive						
Borchard Road to Redfield Avenue	7,400	N/A	53	<50	--	--
Montgomery Road						
Avenue De Las Flores to Janss Road	4,100	N/A	<50	<50	--	--
Moorpark Road						
Calle Centento to Olsen Road	4,800	14,000	140	<50	409	130
Olsen Road to Avenue De Las Arboles	8,300	13,000	242	78	379	120
Avenue De Las Arboles to Avenue De Las Flores	17,000	45,100	477	151	1,274	403
Avenue De Las Flores to Hillcrest Drive	21,500	23,100	628	200	692	220
Hillcrest Drive to U.S. 101	27,000	29,000	788	250	847	269
U.S. 101 to Rolling Oaks Drive	13,000	10,000	206	72	160	<50
Kolling Oaks Drive to Green Meadow Avenue	5,000	6,500	85	<50	107	<50
Mountcleff Blvd.						
Olsen Road to Avenue De Las Arboles	4,200	N/A	<50	<50	--	--

a The distances are from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.

b Based on data provided by City Traffic Engineer, September 1986.

N/A Not available.

TABLE 17 (continued)

Roadway	Average Daily Traffic 1985	Average Daily Traffic 2005[b]	Distance in Feet to dB CNEL Contour[a] 1985 60 dB	1985 65 dB	2005 60 dB	2005 65 dB
Newbury Road						
Borchard Road to Madrid Court	7,900	N/A	124	<50	--	--
Madrid Court to Ventu Park Road	9,300	17,500	102	<50	255	81
Old Conejo Road						
Reino Road to Wendy Drive	14,000	12,000	221	72	190	63
Olsen Road						
Starfire Avenue to Moorpark Road	6,300	10,000	185	63	293	95
Moorpark Road to Route 23	8,175	17,000	241	82	497	160
Route 23 to city limits	24,000	38,000	701	224	1,110	352
Pederson Road						
Olsen Road to Erbes Road	4,000	6,000	<50	<50	95	<50
Potrereo Road						
Reino Road to west city limits	N/A	7,000	--	--	111	<50
Rancho Road						
Hillcrest Drive to Thousand Oaks Blvd.	5,500	N/A	<50	<50	--	--
Thousand Oaks Blvd. to U.S. 101	15,000	N/A	107	<50	--	--
Rancho Conejo Blvd.						
U.S. 101 to Hillcrest Drive	17,000	27,600	232	111	319	150
Hillcrest Drive to Camino Dos Rios	9,100	16,200	126	61	184	87
Camino Dos Rios to Ventu Park	N/A	20,400	--	--	214	101
North of Ventu Park	N/A	11,000	--	--	143	68
Reino Road						
Lynn Road to Kimber Drive	4,700	4,800	99	<50	101	<50
Kimber Drive to Borchard Road	6,800	8,700	199	65	254	82
Borchard Road to Old Conejo	8,700	7,800	191	66	172	60
Rolling Oaks Drive						
Moorpark Road to Los Padres Drive	6,300	N/A	<50	<50	--	--
St. Charles Drive						
McCloud Ave. to Wilbur Rd.	4,500	11,900	<50	<50	118	50
Sunset Hills Blvd.						
Erbes Road to Westlake Blvd.	N/A	11,000	--	--	173	56

a The distances are from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
N/A Not available.

TABLE 17 (continued)

Roadway	Average Daily Traffic 1985	Average Daily Traffic 2005[b]	Distance in Feet to dB CNEL Contour[a] 1985 60 dB	1985 65 dB	2005 60 dB	2005 65 dB
Thousand Oaks Blvd.						
Marin Street to Moorpark Road	7,800	N/A	124	<50	--	--
Moorpark Road to Westlake Blvd.	19,600	24,000	311	103	378	123
Westlake Blvd. to city limits	12,500	15,000	199	71	238	82
Townsgate Road						
Hampshire Road to Westlake Blvd.	8,900	N/A	194	63	--	--
Westlake Blvd. to Village Glen	11,000	20,000	240	78	436	139
Village Glen to Lakeview Canyon	5,100	20,000	113	<50	436	139
Triunfo Canyon Road						
Westlake Blvd. to city limits	4,900	10,000	147	<50	293	98
Ventu Park Road						
Rancho Conejo Road to Hillcrest Drive	N/A	18,300	--	--	288	93
Hillcrest Dr. to U.S. 101	13,000	23,200	285	97	507	164
Newbury Road to Lynn Road	8,500	9,500	248	79	277	88
Village Glen						
Agoura Road to Townsgate Road	6,500	N/A	<50	<50	--	--
Wendy Drive						
Camino Dos Rios to Kimber Drive	12,500	18,000	273	89	393	126
Kimber Drive to Felton Street	6,900	6,400	124	<50	141	<50
Felton Street to Lynn Road	<4,000	6,400	<50	<50	141	<50
Westlake Blvd.						
Sunset Hills Blvd. to Valley Springs Drive	N/A	10,500	--	--	309	104
Valley Springs Drive to Hillcrest Drive	5,400	18,000	160	<50	526	168
Hillcrest Drive to Thousand Oaks Blvd.	11,000	22,000	324	110	207	643
Thousand Oaks Blvd. to Townsgate Road	27,500	32,500	804	257	950	303
Townsgate Road to Triunfo Canyon Road	17,000	20,000	498	163	585	190
Triunfo Canyon Road to Bridgegate Court	10,000	15,000	294	99	439	143
Bridgegate Court to Potrero Road	5,900	15,000	177	68	440	145
Wilbur Road						
Hillcrest Drive to Moorpark Road	7,200	15,000	77	<50	236	115
Moorpark Road to Hodencamp Road	9,500	9,000	151	<50	143	<50

a The distances are from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
N/A Not available.

EXHIBIT 8

EXISTING TRANSPORTATION SOURCE dB CNEL CONTOURS

OVERSIZE MAP AVAILABLE AT PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT

TABLE 18

1985 POPULATION IMPACTED BY TRANSPORTATION NOISE SOURCES[1]

Source	60 to 65 dB CNEL	65+ dB CNEL	Total
U.S. 101	1,125	950	2,075
Route 23	2,475	875	3,350
Major Roadways	7,875	1,625	9,500
Total	11,475	3,450	14,925

1 Based on land use element of the general plan and 1980 U.S. census data.

5.2 FUTURE PROJECTIONS

Future noise contours for the year 2005 are depicted in Exhibit 9. The contours reflect projected increases in traffic volumes. The population impacted by all transportation noise sources is shown in Table 19. The number of people within the 65 dB CNEL and greater contours increases by approximately 300 percent when compared to existing conditions. This is a result of both substantial increases in traffic volume and increased urbanization within the city. The number of people impacted within the 60 to 65 dB CNEL also increases significantly. These projected increases in population impacted serves to highlight the importance of comprehensive land use planning.

TABLE 19

2005 POPULATION IMPACTED BY TRANSPORTATION NOISE SOURCE[1]

Source	60 to 65 dB CNEL	65+ dB CNEL	Total
U.S. 101	4,500	3,550	8,050
Route 23	4,225	1,525	5,750
Major Roadways	10,425	5,275	15,600
Total	19,150	10,250	29,400

1 Based on land use element of the general plan.

EXHIBIT 9

FUTURE TRANSPORTATION SOURCE dB CNEL CONTOURS

OVERSIZE MAP AVAILABLE AT PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT

5.3 NOISE IMPACTS

The effects of 60 and 65 dB CNEL on residents is summarized in Table 20. While there is no health hazard, the existing and future noise contours identify areas where outdoor speech interference can occur and a small percentage of the population will be highly annoyed.

TABLE 20

EFFECTS OF NOISE ON PEOPLE (RESIDENTIAL LAND USES)

	dB CNEL	
Effects[1]	60	65
Hearing Loss	Will not occur	Will not occur
Speech Interference		
Outdoor (distance for 95% sentence intelligibility)	2.0 meters (6.6 ft.)	1.5 meters (4.9 ft.)
Indoor (sentence intelligibility)	100%	100%
Highly Annoyed[2]	9%	15%
Average Community Reaction[3]	Moderate	Significant
General Community Attitude Towards Area	No more important than various other environmental factors	Adverse aspect on the community environmental

1 "Speech Interference" data are drawn from the following tables in EPA's "Levels Document": Table 3, Fig. D-1, Fig. D-2, Fig. D-3. All other data from National Academy of Science 1977 report "Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Evaluation of Environmental Impact of Noise."

2 Depends on attitudes and other factors. An unknown small percentage of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in integrating annoyance over a very long time.

3 Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment.

Note: Research implicates noise as a factor producing stress-related health effects such as heart disease, high-blood pressure and stroke, ulcers and other digestive disorders. The relationships between noise and these effects, however, have not as yet been quantified.

Source: U.S. Department of Transportation, Federal Interagency Committee on Urban Noise, Guidelines for Considering Noise in Land Use Planning Control, page D-2, June 1980.

A summary of noise impacts by source is provided in Table 21.

TABLE 21

NOISE IMPACTS BY SOURCE

Source	Impacts
U.S. 101	CNEL noise levels are significant and the 60 dB extends a substantial distance off the right-of-way The peak residential area noise level measured was 72 dB(A), Site 19. Noise walls along some segments of U.S. 101 have reduced noise levels to less than 60 dB CNEL.
Route 23	The 60 and 65 dB CNEL contours extend substantial distances into the community. The peak noise level at a residential noise measurement location, Site 5, was 75 dB(A).
Major Roadways	Noise-sensitive land uses along major roadways are impacted by traffic noise. A peak level of 82 dB(A) was measured at Site 9 in a residential neighborhood.
Construction	Construction noise can be annoying to adjacent noise-sensitive land uses. However, construction noise is typically limited to several months durations and daytime hours.
Commercial/Industrial	In general, commercial/industrial operations and activities are not considered a city-wide noise problem. Isolated noise problems can occur where commercial/industrial uses are located near a noise-sensitive land use.

5.4 SUPPLEMENTAL NOISE ANALYSIS

During the development of the noise element, the Planning Commission requested a methodology for evaluating noise impacts that was not dependent on a 24-hour average as was the CNEL methodology. The CNEL noise contours were developed to satisfy the recommendation by the state that noise elements include contours depicting 24-hour noise average. The Planning Commission, with support from the City Council, determined that Equivalent Noise Level (Leq) noise contours should also be developed. An Leq is still an average of noise levels, however, Leq values are commonly measured for much shorter periods of 15 to 60 minutes. To evaluate worse-case conditions, Leq noise contours were prepared for existing and future a.m.

and p.m. peak hours. According to the city traffic engineer, a.m. peak hour traffic volumes between 7 a.m. and 8 a.m. represent 6 percent of the total average daily traffic. The p.m. peak hour traffic volumes between 5 p.m. and 6 p.m. represent 9 percent of the total average daily traffic.

The Federal Highway Administration has established Leq noise standards applicable to federally funded highway projects as provided on page 17. However, these levels have been lowered in consideration of the desire for a higher quality of life within the City of Thousand Oaks. The applicable exterior and interior Leq noise compatibility criteria for the City of Thousand Oaks is provided in Table 22.

TABLE 22

LEQ NOISE COMPATIBILITY CRITERIA

Category	Maximum Leq	Location	Land Use
A	55	Exterior	Open space, parks, amphitheater and other tracks of land in which severity and quiet are of extraordinary significance and serve an important public need.
B	65	Exterior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries and hospitals, and picnic areas, recreation areas, playgrounds, active sports areas and parks not included in Category A.
C	72	Exterior	Developed lands, properties or activities not included in Categories A and B.
D	52	Interior	Residences, motels, hotels, public meeting rooms, schools, libraries, hospitals and auditoriums.

The distances to the existing and future peak hour 55, 65 and 72 Leq noise contours are provided in Appendix A, Table A-1 through A-4. The existing a.m. peak hour Leq noise contours are shown in Exhibit 10. The 72 Leq is within the roadway right-of-way for all major roadways and is mapped for U.S. 101 and Route 23 where it extends at least 100 feet from the roadway centerline. The 65 Leq extends less than 181 feet from the roadway centerline for all roadways except U.S. 101 and Route 23. Along U.S. 101, the 65 Leq encompasses residential units near Hampshire Road. No residential units along Route 23 are impacted by the 65 Leq. Substantial areas of the

EXHIBIT 10

EXISTING TRANSPORTATION A.M. PEAK HOUR LEQ NOISE CONTOURS

OVERSIZE MAP AVAILABLE AT PLANNING AND
COMMUNITY DEVELOPMENT DEPARTMENT

city are within the 55 Leq, including areas along U.S. 101 and Route 23, areas along Moorpark Road, Lynn Road and Erbes Road north of U.S. 101 and areas along Westlake Boulevard, Borchard Road and Reino Road south of U.S. 101. Avenue De Los Arboles and Janss Road also carry sufficient traffic to generate off-roadway 55 Leq noise contours along the roadway segments between Moorpark Road and Route 23.

The distances to the existing p.m. peak hour 55, 65 and 72 Leq noise contours are found in Table A-2 of Appendix A and are slightly larger than with the a.m. peak. This reflects the 9 percent factor for the p.m. peak average daily traffic versus 6 percent for the a.m. peak. Exhibit 11 depicts these Leq noise contours. The 72 Leq contours for U.S. 101 and Route 23 are all within 199 feet of the roadway and do not impact adjacent land uses. The 65 Leq noise contours are within 267 feet of all roadway centerlines except for U.S. 101 and Route 23. Residential land uses near Hampshire Road are within the 65 Leq from U.S. 101. The exhibit depicts 65 Leq contours for portions of Lynn, Moorpark and Olsen Roads. The 55 Leq covers a substantial portion of the city with U.S. 101, Route 23, Moorpark Road, Lynn Road, Erbes Road, Olsen Road, Avenue De Los Arboles, Janss Road, Westlake Boulevard, Borchard Road, Reino Road and Wendy Drive all exhibiting significant distances from roadways.

The distances to the future a.m. 55, 65 and 72 Leq noise contours are substantially greater than under existing conditions (see Appendix A, Table A-3). However, the 72 Leq is still within all roadway right-of-ways except for U.S. 101 and Route 23, as shown in Exhibit 12. The 65 Leq does not extend beyond 288 feet from the roadway centerline for any roadway except U.S. 101 and Route 23. Roadways with the 65 Leq depicted include Lynn, Moorpark and Olsen Roads and Westlake Boulevard. The 55 Leq covers substantial portions of the city with a number of incompatible uses within the noise contours.

The future p.m. 55, 65 and 72 Leq contour distances are provided in Appendix A, Table A-4 and depicted in Exhibit 13. The 72 Leq extends a maximum of 223 feet from the centerline of U.S. 101 between Rancho Conejo Boulevard and Rancho Road. The 65 Leq encompasses areas along U.S. 101 and Route 23 and extends a maximum of 628 feet along U.S. 101. The 65 Leq extends 432 feet from the roadway centerline along Moorpark Road between Avenue De Los Arboles to Avenue De Los Flores. Other major roadways with 65 Leq contours of 200 feet or more include Avenue De Los Arboles, Lynn, Moorpark and Olsen Roads, and Westlake Boulevard. The 55 Leq encompasses substantial portions of the city.

EXHIBIT 11

EXISTING TRANSPORTATION P.M. PEAK HOUR NOISE LEQ NOISE CONTOURS

OVERSIZE MAP AVAILABLE AT PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT

EXHIBIT 12

FUTURE TRANSPORTATION A.M. PEAK HOUR LEQ NOISE CONTOURS

OVERSIZE MAP AVAILABLE AT PLANNING AND
COMMUNITY DEVELOPMENT DEPARTMENT

EXHIBIT 13

FUTURE TRANSPORTATION P.M. PEAK HOUR LEQ NOISE CONTOURS

OVERSIZE MAP AVAILABLE AT PLANNING AND
COMMUNITY DEVELOPMENT DEPARTMENT

PART 6. GOALS, POLICIES, AND PROGRAMS

The purpose of the noise element is to provide information to insure noise compatibility. Basic noise principles are highlighted below. The goal, policies, and programs that follow are designed to resolve or mitigate existing and future noise problems.

- Noise can be annoying and cause damage to people.
- Sound levels decrease with distance from the noise source.
- Noise can be reflected, scattered, and absorbed by barriers to the sound transmission path.
- Effective construction methods can substantially reduce exterior to interior noise intrusion.
- It is the city's responsibility to impose land use controls to protect the general public from adverse noise impacts.

6.1 GOAL

To protect the health, safety, and general welfare of the public from adverse noise impacts.

A. Policy

To incorporate noise considerations into the community planning process to prevent or minimize future noise impacts to existing land uses.

Programs

- Restrict construction time and day to minimize noise impacts to existing noise sensitive land uses.
- Require new noise sources to be mitigated to an acceptable exterior level of 65 dB CNEL or less at existing noise sensitive land uses.
- Where newly introduced noise sources will generate a noise level exceeding an exterior 60 dB CNEL at noise sensitive locations, an acoustical analysis report shall be prepared showing noise mitigation measures designed to achieve interior noise levels of 45 dB CNEL or less at noise sensitive locations.
- Adopt a noise control ordinance to restrict noise impacts.

- Require new noise sources to mitigate noise levels to an acceptable Leq exposure at adjacent land use as defined in Table 22 on page 48.

B. Policy

To locate noise compatible land uses near existing and proposed transportation facilities.

Programs

- Non-noise sensitive land uses will be encouraged along transportation routes.
- Noise sensitive land uses will not be allowed within an exterior transportation source noise level of 65 dB CNEL or higher unless noise mitigation measures have been incorporated into the design of the project to reduce the noise levels to less than 65 dB CNEL at all exterior living space including single-family yards and multi-family patios, balconies, pool areas, cook-out areas and recreation areas.
- An acoustical analysis report showing the ability to ensure interior noise levels of 45 dB CNEL or less will be required for all residential developments within a 60 dB CNEL or higher.
- Interior noise levels at institutional noise sensitive land uses shall be mitigated to 45 dB CNEL or less.
- Enforce the California Sound Transportation Control Standards (Title 24 California Administrative Code) to ensure an acceptable multi-family interior noise level of 45 dB CNEL in habitable rooms.
- Require new development to achieve the Leq noise compatibility criteria as defined in Table 22 on page 48.

C. Policy

To avoid locating future noise sensitive land uses near stationary noise sources.

Programs

- Major noise sources will be concentrated in areas of compatible uses.
- Noise sensitive land uses will not be allowed within an exterior stationary source 65 dB CNEL or higher unless noise mitigation measures have been

incorporated into the design of the project to reduce the noise levels to less than 65 dB CNEL at all exterior living space including single-family yards and multi-family patios, balconies, pool areas, cook-out areas and recreation areas.

- An acoustical analysis report showing the ability to meet state noise insulation standards will be required for all new residential developments exposed to exterior noise levels of 60 dB CNEL or higher.

- Interior noise levels at non-residential noise sensitive land uses shall be mitigated to 45 dB CNEL or less.

D. Policy

To cooperate with all levels of government to minimize noise impacts.

Program

- Cooperate with Ventura County and other governmental agencies to promote noise compatible development. Enforce the California Sound Transmission Control Standards (Title 24 California Administrative Code) for dwellings other than attached single-family dwellings to ensure an acceptable interior noise level of 45 dB CNEL in habitable rooms and to maintain adequate noise isolation between attached units.

- Encourage the control of transportation noise as the most effective means of reducing noise in the community.

E. Policy

To inform residents of the effects of noise pollution.

Program

- Provide information to the public regarding the health effects of high noise levels and means to reduce noise levels and their impacts.

PART 7. IMPLEMENTATION

The City of Thousand Oaks can achieve a noise compatible environment through comprehensive land use planning. Proposed developments are evaluated in terms of the projected impact from future noise sources and the application of the city's policies and programs. The city's CNEL and Leq noise compatibility objectives by land use are summarized in Table 23. Proposed residential and other noise-sensitive projects impacted by a 65 dB CNEL or greater would require additional acoustical analysis to achieve acceptable exterior noise levels. Acceptable interior noise levels of 45 dB CNEL or less must also be achieved. Noise-sensitive land uses include residential (single and multi-family dwellings, mobile home parks, dormitories, and similar uses); transient lodging (including hotels, motels, and similar uses); hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care; and public or private educational facilities, libraries, churches, and places of public assembly. An Leq analysis is also required to ensure a noise compatible environment. Compliance with the Leq criteria can either be through noise measurements during peak hours or through acoustical analysis. In summary, Acoustical Analyses Reports are only required of those projects located within existing or future CNEL or Leq impact areas or as deemed necessary by the city. All Acoustical Analysis Reports shall be prepared by a qualified acoustical engineer with experience in environmental noise assessment and noise control design. The Planning and Community Development Department has review responsibility.

TABLE 23

SUMMARY OF NOISE COMPATIBILITY CRITERIA BY LAND USE

Land Use	Compatibility Criteria
CNEL	
Residential:	
Exterior	Outdoor living areas must be mitigated to 65 dB CNEL or less.
Interior	Habitable rooms must be mitigated to 45 dB CNEL or less.
Noise Sensitive Use:	
Exterior	Same as residential criteria.
Interior	Same as residential criteria.
Commercial:	
Exterior	A noise level of 65 dB CNEL or less or which does not interfere with normal business activity.
Industrial:	
Exterior	A noise level of 70 dB CNEL or less or which does not interfere with normal business activity.
	Public access areas should be 65 dB CNEL or less.

Leq

Category	Land Use	Maximum Leq Value
A	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need, i.e., amphitheaters, parks and open space.	Exterior - 55
B	Residences, motels, hotels, public meeting rooms, schools, churches,libraries and hospitals and picnic areas,recreation areas, playgrounds active sport areas and parks not included in Category A.	Exterior - 65
C	Developed lands, properties or activities not included in categories A or B.	Exterior - 72
E	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.	Interior - 52

PART 8. NOISE MITIGATION

Noise control is a function of the noise source, transmission path, and receiver as shown in Exhibit 14. The arcs represent the transmission path with the wall and residence decreasing noise transmission. The most effective noise control actions are a combination of reducing the noise at the source, lengthening or interrupting the noise transmission path, and locating noise sensitive land uses away from noise sources.

8.1 NOISE CONTROL AT THE SOURCE

The major noise sources in the city are vehicular traffic on U.S. 101, Route 23 and major roadways. As discussed previously, the California Vehicle Code contains noise limits applicable to new vehicles at the time of manufacture and noise regulations pertaining to the operation of all vehicles on public roads. Possible actions by the city to minimize noise at the source include reducing vehicle speeds, establishing truck routes, and regulating traffic flow. Machinery noise also can be annoying to adjacent noise sensitive land uses. Exhibit 15 identifies possible noise mitigating actions at a stationary noise source.

Commercial and industrial uses could become major noise sources in the future. Effective site planning and layout can minimize noise transmission to nearby receptors. Traffic access points, loading areas, and noise-generating machinery should all be located away from noise sensitive areas or mitigated.

8.2 CONTROL ALONG THE NOISE TRANSMISSION PATH

The transmission path from the source to the receiver has distinct and significant effects upon the characteristics of the sound reaching the receiver. Physical barriers can interfere with the path of sound waves as shown in Exhibit 16. Examples of such structures are walls, berms, and certain types of trees and hedges, as well as topography. The influence of a structure may be accidental, or it may be intentional, such as the use of intervening buildings between the source of sound and the receiver to reduce the intensity of the sound wave. Physical barriers either reflect the sound wave and/or absorb some of the energy.

EXHIBIT 14

Noise
Transmission

City of Thousand Oaks

FORESITE

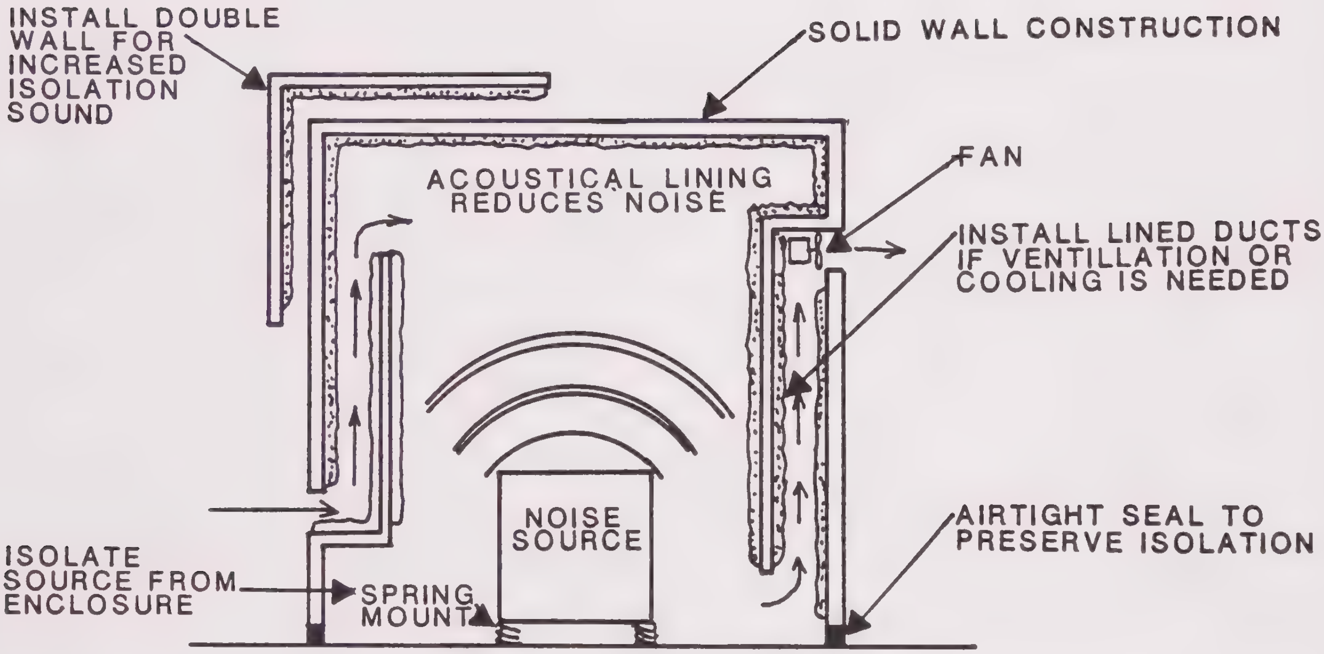


EXHIBIT 15

Noise Control
at a Stationary Source

City of Thousand Oaks

FORESITE

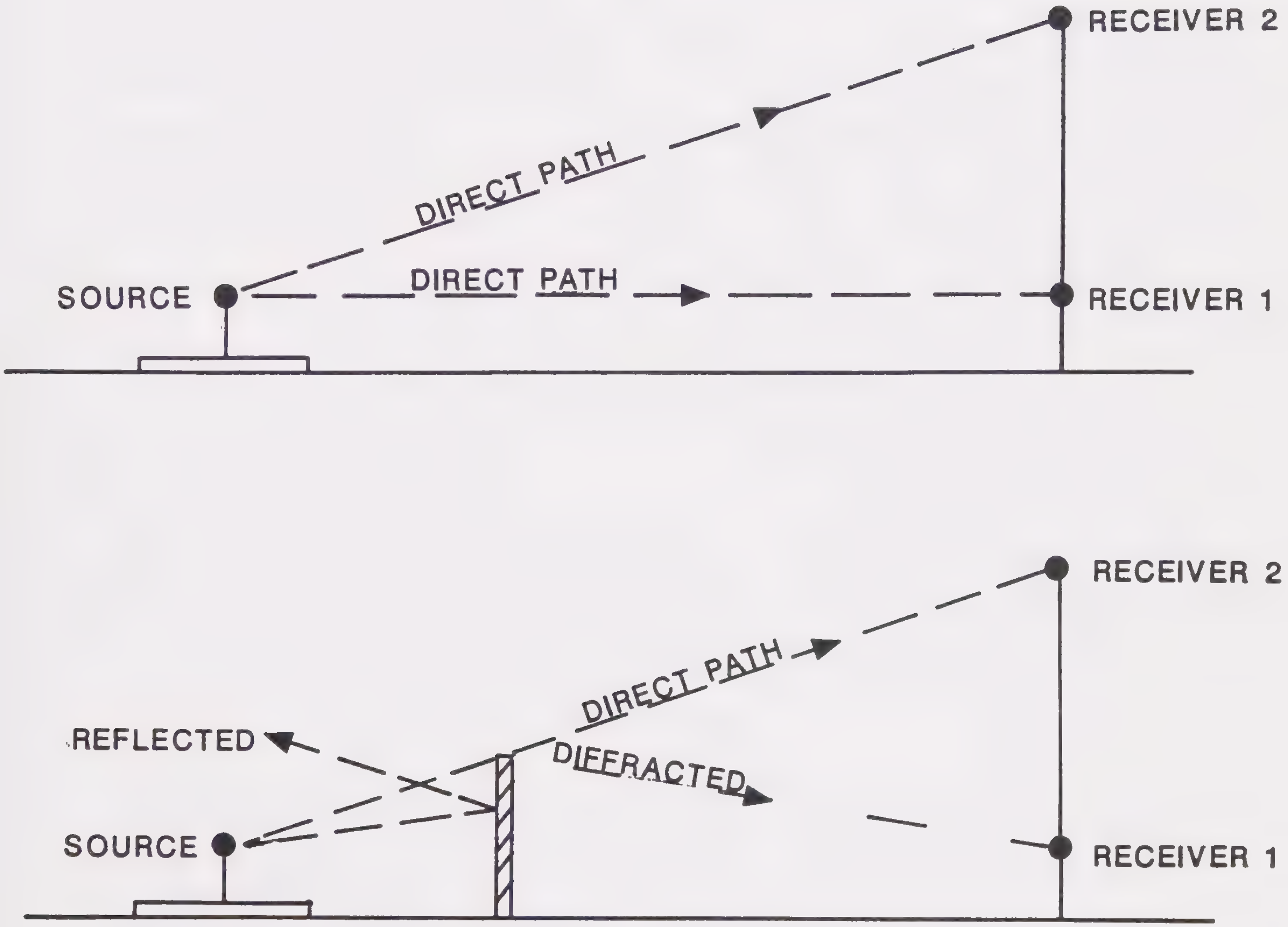


EXHIBIT 16

Noise Barrier
Attenuation

City of Thousand Oaks

FORESITE

Noise-attenuating barriers are commonly incorporated into projects and can effectively reduce noise levels. The effectiveness of a barrier depends on the relative height and materials of the barrier, the noise source, the affected area, and the horizontal distance between the source and the barrier, and between the barrier and the affected area. The importance of barrier location is shown in Exhibit 17 Barriers are often the only measure available to attenuate adverse noise levels. If they are evaluated early in the planning stage, they can be integrated into the architectural design of a proposed project at minimal cost. Table 24 shows possible noise reduction from several types of barriers.

TABLE 24

BARRIER NOISE REDUCTION

Type	Noise Reduction
Earth Berm[1]	Up to 15 dB
Block Walls[2]	Up to 15 dB
Trees and Shrubs[3]	3 to 5 dB

1 The berm must be high enough to block the line-of-sight between source and receiver.

2 Block walls must be high enough to block line-of-sight. Walls must be long enough to prevent noise from going around the ends of the structure.

3 Trees and shrubs must be dense vegetation and at least 100 feet in depth.

When there are natural features on a site, such as hills and ridges, valleys and depressions, they should be preserved and incorporated into the site plan as a buffer to minimize noise transmission. A noise barrier may be any solid structure high and dense enough to reflect, rather than allow the passage of sound waves. While noise barriers can be extremely effective, their aesthetic effect on a neighborhood must be considered. Landscaping, in conjunction with solid barriers, can reduce noise while mitigating the visual impact of the barriers themselves.

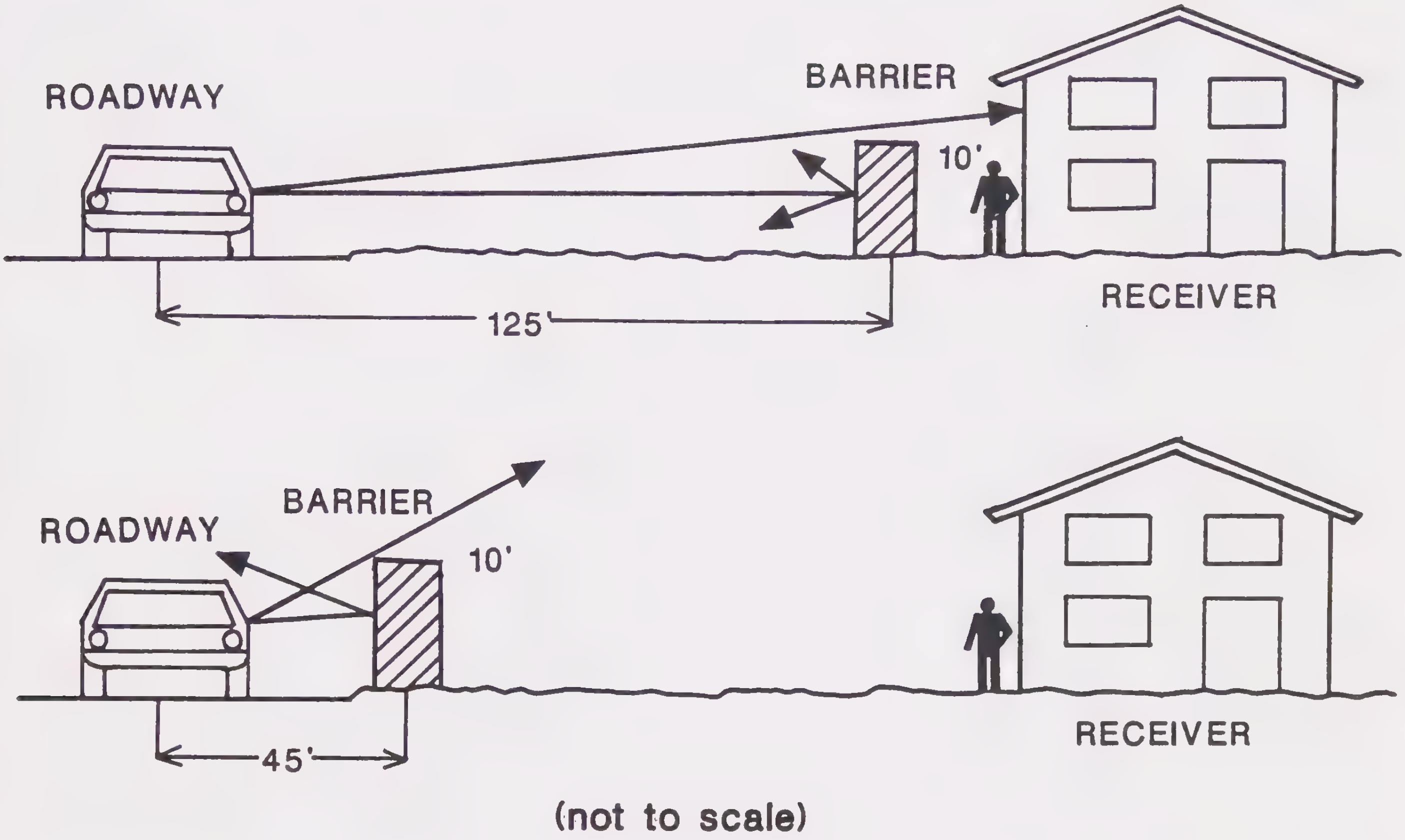


EXHIBIT 17

Effect of
Moving A Noise Barrier

City of Thousand Oaks

FORESITE

Noise can be scattered, absorbed, and reduced by vegetation. However, a planted strip of trees and bushes must be 50 to 100 feet thick to reduce noise levels significantly. There are two other ways in which plants can be useful in reducing the effect of noise. First, a visual screen of plants between a noise source and a sensitive area is not only aesthetically pleasing, but also affects the perceived noise level by those who cannot see the noise source. Rows of dense bushes, vines, or trees planted along a major expressway soften the impact of the traffic, even though the actual noise level is reduced very little. Second, bushy plants located around walls, hills, road shoulders, and other large impervious obstacles improve their effectiveness as noise barriers and lower the amount of noise reflected from hard surfaces.

8.3 NOISE CONTROL AT THE RECEPTOR

The control of noise at the receiver primarily focuses on isolating noise sensitive activities from noise sources. Methods for noise control at receptors include: locationing non-noise sensitive uses within the 60 dB CNEL, planning site layouts to mitigate or block noise transmission, incorporating design and construction techniques to insulate individual noise sensitive buildings, and redevelopment of existing noise impacted areas with noise compatible uses. An example of noise mitigating site design is shown in Exhibit 18. This exhibit indicates effective site planning by locating non-noise sensitive parking areas closest to the noise source. This exhibit also locates one structure (Building 10) so as to shield the remaining buildings and outdoor living areas from noise intrusion.

Limiting the height of a structure can also minimize noise impacts as shown in Exhibit 19. Because of the extensive topography variation throughout the city this can be a very effective means of noise control.

Incorporating noise insulation into noise sensitive land uses can also be very effective. Exhibit 20 identifies some of the noise intrusion paths of a typical residential dwelling.

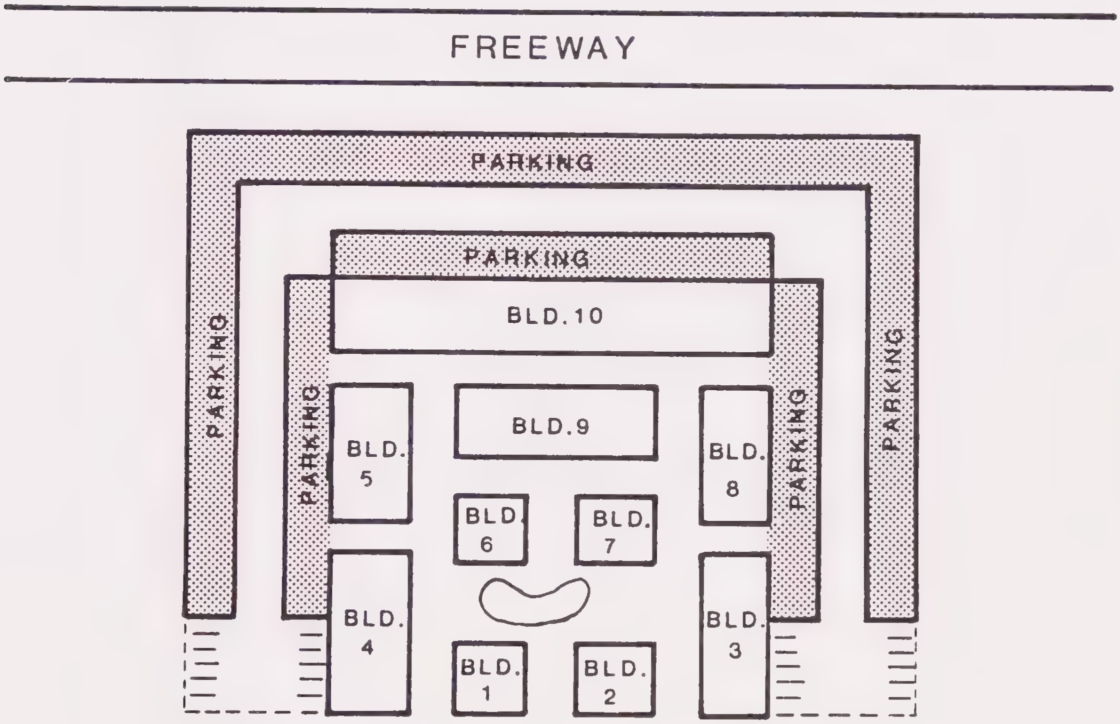


EXHIBIT 18
Site Design
for the Attenuation of Noise
City of Thousand Oaks

FORESITE

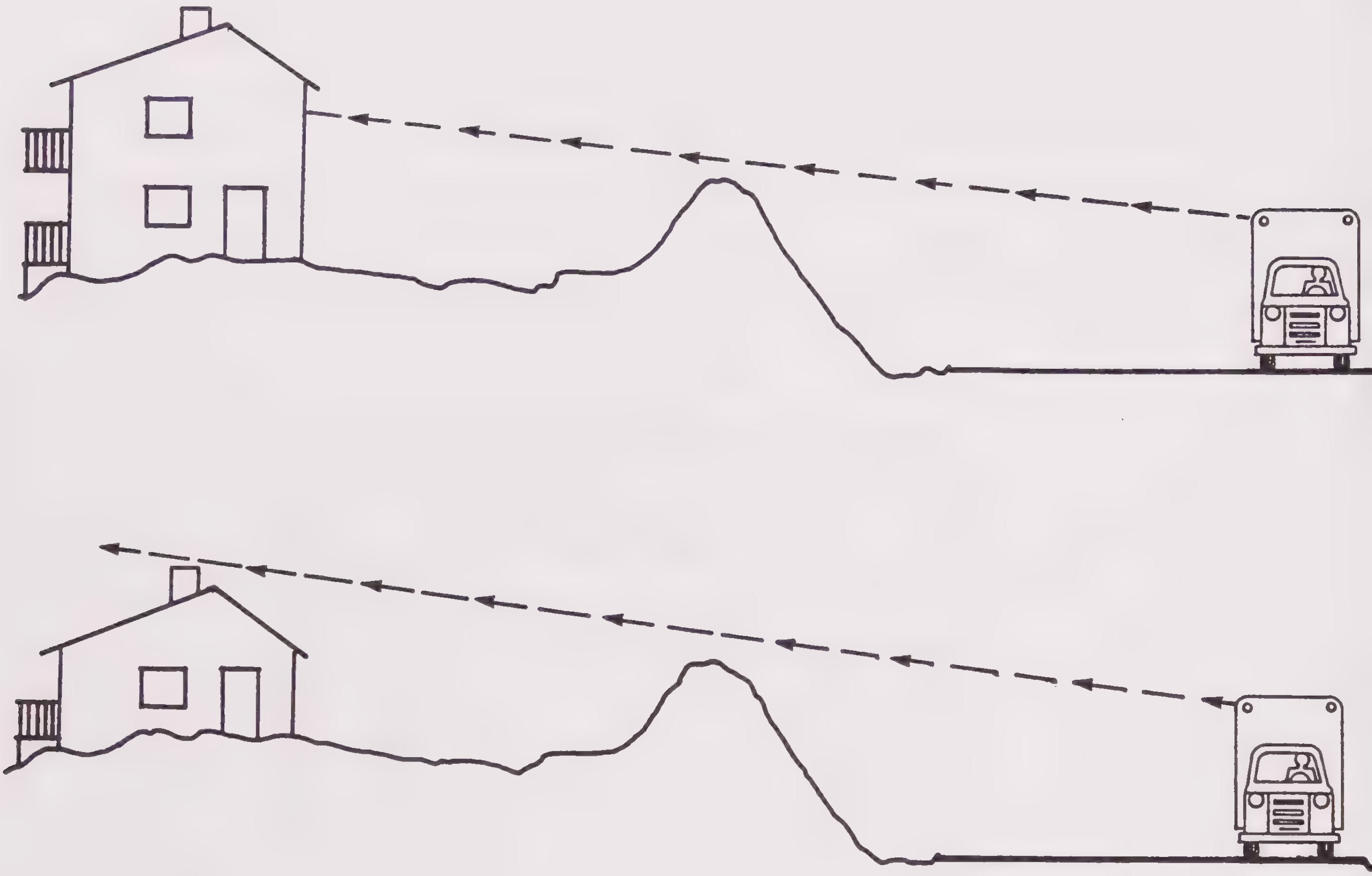


EXHIBIT 19

Limiting Height
to Minimize Noise Impact

City of Thousand Oaks

FORESITE

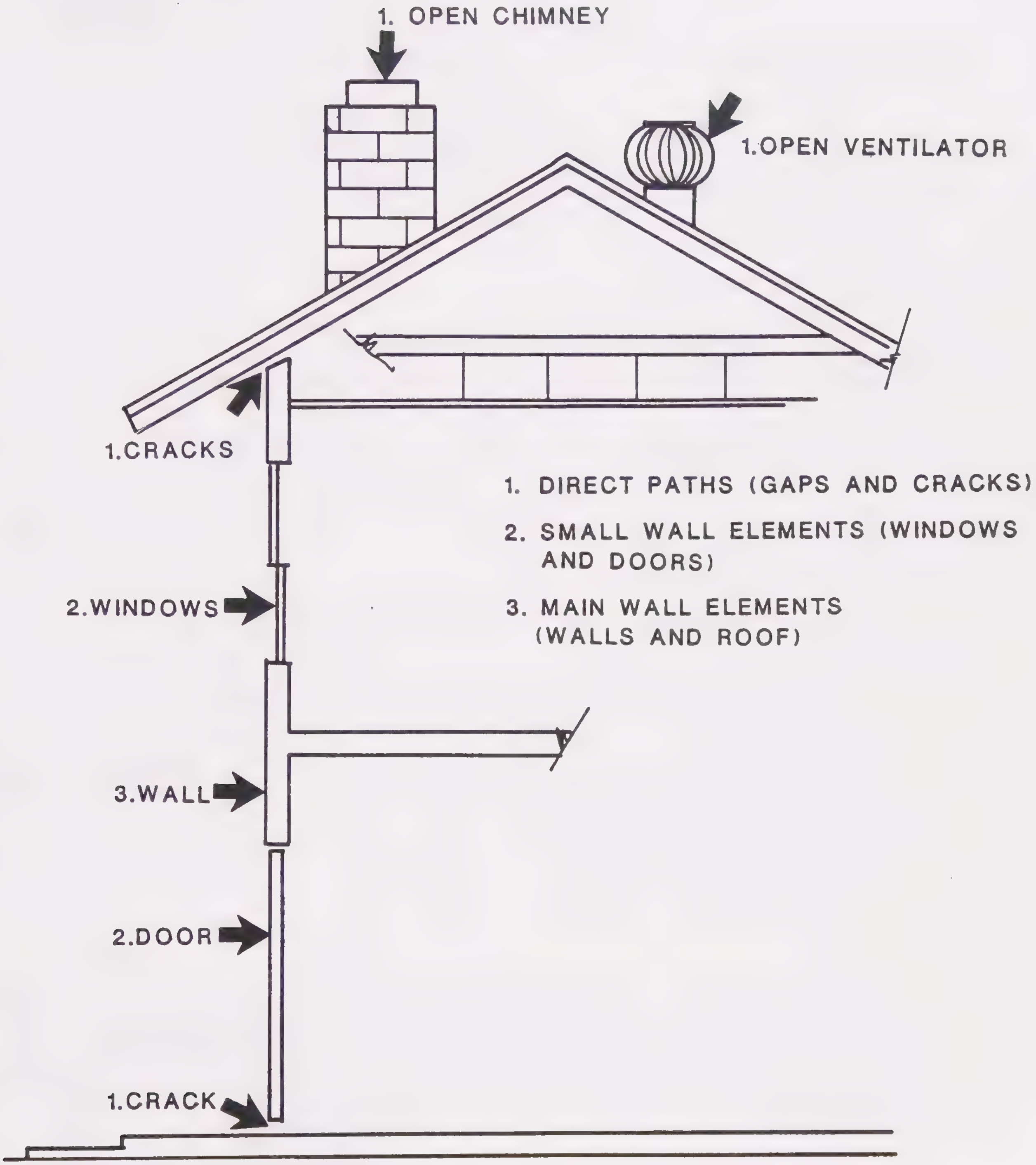


EXHIBIT 20
Noise
Intrusion Paths
City of Thousand Oaks

FORESITE

Noise mitigating actions at the source could include any of the methods listed below.

Acoustical Site Planning

- Increase the distance from noise source to receiver.
- Minimize wall surfaces that are oriented directly towards noise source.
- Cluster noise sensitive development.

Acoustical Architectural Design

- Minimize window area oriented towards the noise source.
- Reduce window-to-wall percentages (window area to wall size).
- Locate noise sensitive rooms away from the noise source.
- Locate balconies on the sides of homes which are opposite the noise source.

Acoustical Construction

- Construct walls with greater sound insulation capabilities.
- Provide air conditioning, thus lessening the need to open windows for cool ventilation.
- Increase thickness of glass on windows.
- Install double-glazed windows.
- Install fixed pane windows.

8.4 SUMMARY

In dealing with specific existing and potential noise problems, the estimated benefits from implementation of specific noise mitigation techniques are shown in Table 25. The noise mitigation techniques are applicable to highway noise sources.

TABLE 25

ESTIMATED dB CNEL DECREASE FOR VARIOUS MITIGATION TECHNIQUES APPLICABLE TO HIGHWAY NOISE SOURCES

Mitigation Technique	Decrease in dB CNEL	Qualifications for Application
Change vehicle mix	10 to 12	Prohibition of heavy trucks from highways.
Lower traffic speed	5	From 55 mph to 30 mph with 10 percent heavy trucks.
Decrease traffic volume	3	50 percent decrease in 24-hour traffic flow.
Increase the distance from the noise source to receiver	20 to 23	At 1,500 ft. and relative to receiver distance level at 50 ft.
Locate a barrier or berm between source and receiver	5 to 18	Receiver is shielded by the barrier and is within 25 ft. of the barrier.
Shielding by buildings or building components	3 to 15	Building, courtyards, screened yards, and shielded balconies. Relative to level at building location.
Building envelope noise level reduction	15 to 40	Varies from normal construcion with open window to a tightly sealed envelope utilizing special acoustical design features. Relative to level at the building location.

Source: U.S. Department of Transportation, Federal Highway Administration, Guidelines for the Prevention of Traffic Noise Problems, April 1985.

PART 9. ENFORCEMENT

Noise control programs involve federal, state, county, and city agencies. Table 26 highlights noise control responsibilities by agency. Other agencies are also involved with noise control, however those identified in Table 26 cover the major noise issues found in the city.

The primary local administrative controls to prevent noise and land use in compatibilities, are found in the general plan and zoning ordinance. For the city to achieve noise and land use compatibility, it is imperative that mitigation measures and/or restrictions be imposed on future noise sensitive developments proposed within 65 dB CNEL contours from transportation sources. The 45 dB CNEL or less interior criteria for noise sensitive land uses must also be achieved. In addition, noise sensitive developments, proposed near existing stationary noise sources generating noise levels exceeding 65 dB CNEL should also be reviewed. The Leq noise and land use compatibility criteria as stated in Table 22 must also be achieved. The submittal of an Acoustical Analysis Report to the Planning and Community Development Department for those projects within an existing or future CNEL or Leq impact areas or as deemed necessary by the city is the mechanism to evaluate proposed projects. A site specific evaluation of noise levels considering topography and other factors, the incorporation of mitigation measures as described in Part 8 and other actions may enable a project to comply with exterior and interior noise compatibility criteria. However, the Planning and Community Development Department should evaluate each project individually.

The city should also adopt a noise ordinance. Noise ordinances are typically directed at controlling noise from stationary sources and its intrusion onto adjacent properties. The enforcement of the noise ordinance is an effective tool to control non-transportation noise sources.

TABLE 26

NOISE CONTROL RESPONSIBILITY BY ACTIVITY AND AGENCY[1]

Agency	General Policies	Highway Noise	Aviation Noise	Occupational Noise	Construction Noise	Land Use Compatibility	Building Siting	Complaints	Research	Product Noise
Federal										
Dept. of Housing and Urban Dev.						X			X	
Dept. of Labor				X	X					
Environmental Protection Agency	X	X	X			X			X	X
Federal Aviation Administration			X							
Federal Highway Administration		X								
State										
Dept. of Health	X			X		X			X	
Dept. of Transportation		X	X			X				
County of Ventura	X								X	
City of Thousand Oaks										
City Council	X									
Building Dept.					X	X	X	X		
Planning Dept.						X	X	X	X	
Police Dept.								X		

1 Only the primary activities are identified. Many of the agencies are directly or indirectly involved in all activities.

PART 10. RELATIONSHIP TO OTHER ELEMENTS OF THE GENERAL PLAN

The general plan elements provide important policy guidance to assist in decision-making. All of the elements of the general plan are related and interdependent to some degree. However, the noise element is most closely related to the land use, housing, circulation, and open space elements as shown in Exhibit 17.

The objective of the noise element is to provide guidelines to achieve noise-compatible land use. The land use and noise elements are, therefore, closely related. The noise element, by identifying noise-sensitive land uses and establishing compatibility guidelines for land use and noise, will influence the general distribution, location, and intensity of future land use. Effective land use planning can alleviate noise problems.

Residential areas are one of the most noise-sensitive land uses. Therefore, the housing element is directly affected by the noise element. The housing element policies and programs should include safeguards against noise intrusion. Enforcement of land use and noise compatibility guidelines can reduce noise impacts in residential locations. In addition, effective noise insulation in housing construction can mitigate exterior to interior noise intrusion.

The circulation system within a city is one of the major sources of noise. Therefore, the existing and future circulation system identified in the circulation element will greatly influence the noise environment. The circulation routes such as the freeway, highways, and truck routes, should be located to minimize noise impact upon noise-sensitive land use. The location and design of new transportation facilities and possible mitigation of noise from existing and planned facilities will greatly influence the overall noise environment within the city.

Since noise can adversely affect the enjoyment of quiet outdoor activities, the noise element is also closely related to the open space element. Conversely, open space can be used as a noise buffer between incompatible land uses. This technique can reduce community noise impacts and also provide usable open space for recreation.

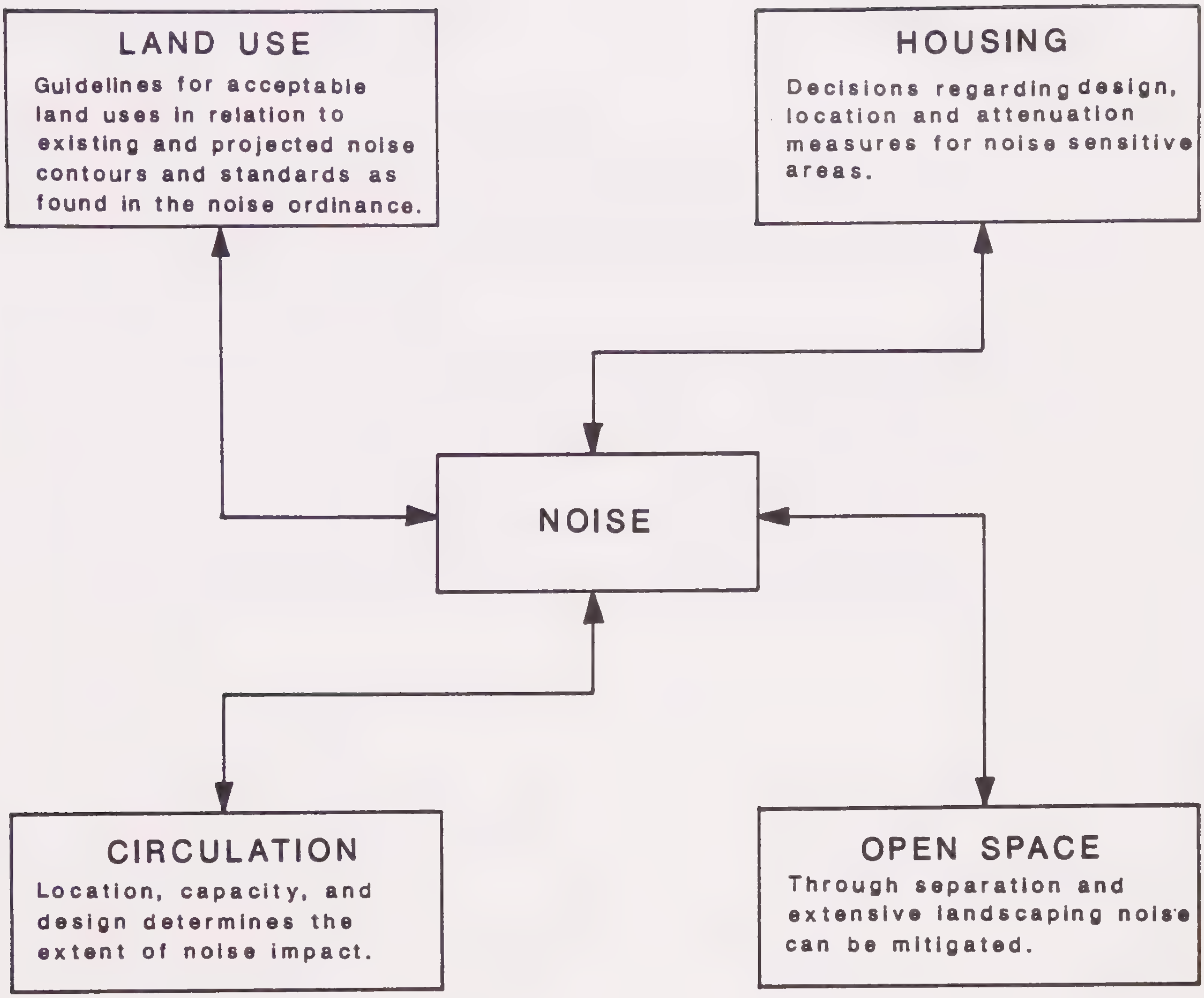


EXHIBIT 21

Interrelationship of Noise Element with Other General Plan Elements

City of Thousand Oaks

FORESITE

PART 11. BIBLIOGRAPHY

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APPENDIX A

PEAK HOUR LEQ CONTOUR DISTANCES BY ROADWAY

TABLE A-1

1985 AM PEAK HOUR LEQ CONTOURS BY ROADWAY[a]

Roadway	Average Traffic[b] Daily	a.m. Peak Hour	Leq 55	65	72	At 50 Feet[c]
U.S. Highway 101						
City limits to Rancho Conejo Blvd.	92,000	5,520	1,718	376	142	73.9
City limits to Rancho Conejo Blvd. (6' wall)	92,000	5,520	680	170	120	73.9
City limits to Rancho Conejo Blvd. (10' wall)	92,000	5,520	550	120	120	73.9
Rancho Conejo Blvd. to Rancho Road	116,800	7,008	1,956	426	157	74.9
Rancho Conejo Blvd. to Rancho Road (10' wall)	116,800	7,008	630	120	120	74.9
Rancho Conejo Blvd. to Rancho Road (12' wall)	116,800	7,008	540	120	120	74.9
Rancho Road to city limits	113,000	6,780	1,914	417	155	74.8
Rancho Road to city limits (6' wall)	113,000	6,780	760	180	120	74.8
Route 23						
U.S. 101 to Avenue De Los Arboles	43,500	2,610	1,014	227	98	70.5
Ave De Los Arboles to Olsen Road	32,500	1,950	836	191	89	69.2
Olsen Road to city limits	18,000	1,080	566	137	<50	66.6
Agoura Road						
Westlake Blvd. to city limits	16,000	960	763	84	<50	64.9
Avenue De Los Arboles						
Westlake Boulevard to Erbes Road	4,000	240	192	<50	<50	59.5
Erbes Road to Oakbrook	11,000	660	702	83	<50	64.2
Oakbrook to Route 23	16,000	960	1,021	111	<50	65.9
Route 23 to Avenue De Las Plantas	21,000	1,260	723	76	<50	65.1
Avenue De las Plantes to Mountcleff Blvd.	13,000	780	448	51	<50	63.0
Mountcleff Blvd. to Velarde Drive	7,430	446	257	<50	<50	60.6
Ave De Las Flores						
Lynn Road to Young Avenue	5,250	315	182	<50	<50	59.1
Borchard Road						
Reino Road to Wendy Drive	8,500	510	406	<50	<50	62.6
Wendy Drive to U.S. 101	16,500	990	786	82	<50	65.6
Camino Dos Rios						
Wendy Drive to Marion Street	9,200	552	317	<50	<50	62.0
Marion Street to Lawrence Drive	<4,000	240	138	<50	<50	58.4

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-1 (continued)

Roadway	Average Traffic[b] Daily	a.m. Peak Hour	Leq 55	65	72	At 50 Feet[c]
Conejo Blvd.						
Thousand Oaks Blvd. to Hillcrest Drive	6,500	390	103	<50	<50	56.8
De Havilland Drive						
Hillcrest Drive to city limits	5,400	324	85	<50	<50	56.3
Duesenburg Drive						
Hillcrest Drive to Thousand Oaks Blvd.	6,500	390	102	<50	<50	57.2
Erbes Road						
Sunset Hills Blvd. to Pederson Road	4,700	282	226	<50	<50	59.7
Pederson Road to Avenue De Los Arboles	8,200	492	392	51	<50	62.1
Avenue De Los Arboles to Hillcrest Drive	10,233	614	488	55	<50	63.4
Hillcrest Drive to Thousand Oaks Blvd.	7,600	456	362	<50	<50	62.9
Gainsborough Road						
Camino Flores to Lynn Road	5,300	318	127	<50	<50	58.0
Lynn Road to Moorpark Road	6,150	369	213	<50	<50	59.8
Hampshire Road						
Thousand Oaks Blvd. to Townsgate Road	23,000	1,380	1,466	153	<50	67.4
Townsgate Road to Westlake Blvd.	15,000	900	715	74	<50	65.3
Hillcrest Drive						
Lawrence Drive to Rancho Conejo Blvd.	9,900	594	632	71	<50	64.2
Rancho Conejo Blvd. to De Havilland Drive	8,700	522	415	<50	<50	62.7
De Havilland Drive to Ventu Park Road	1,400	84	71	<50	<50	54.8
Ventu Park Road to Lynn Road	9,800	588	625	69	<50	64.3
Lynn Road to Moorpark Road	11,500	690	734	83	<50	64.6
Moorpark Road to Duesenberg Drive	9,080	545	218	<50	<50	59.9
Duesenberg Drive to Westlake Blvd.	5,400	324	130	<50	<50	58.0
Hodencamp Road						
Wilbur Road to Hillcrest Drive	7,300	438	253	<50	<50	60.3
Janss Road						
Lynn Road to Dover Avenue	7,550	453	261	<50	<50	60.7
Dover Avenue to Moorpark Road	13,000	780	448	51	<50	63.0
Moorpark Road to Route 23	20,500	1,230	705	73	<50	65.2
Route 23 to El Monte	9,600	576	331	<50	<50	61.7
El Monte to Erbes Road	5,600	336	193	<50	<50	60.2

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-1 (continued)

Roadway	Average Traffic[b]		Leq			
	Daily	a.m. Peak Hour	55	65	72	At 50 Feet[c]
Kanan Road						
Westlake Blvd. to east city limits	<4,000	240	96	<50	<50	56.8
Kimber Drive						
Knollwood Drive to Reino Road	4,300	258	149	<50	<50	58.6
Reino Road to Wendy Drive	5,900	354	204	<50	<50	60.0
Lakeview Canyon Road						
Agoura Road to Thousand Oaks Blvd.	6,200	296	164	<50	<50	61.2
Thousand Oakd Blvd. to Valley Springs Drive	N/A	--	--	--	--	--
Lynn Road						
Starfire Avenue to Avenue De Las Arboles	8,300	498	530	65	<50	63.2
Avenue De Las Arboles to Gainsborough	14,000	840	893	97	<50	65.5
Gainsborough to U.S. 101	26,000	1,560	1,657	168	<50	68.6
U.S. 101 to Green Meadow Avenue	12,000	720	765	81	<50	65.2
Green Meadow Avenue to Wendy Drive	5,325	320	341	<50	<50	61.7
Wendy Drive to Reino Road	N/A	--	--	--	--	--
McCloud Avenue						
St. Charles Drive to Hillcrest Drive	4,900	294	117	<50	<50	58.0
Michael Drive						
Borchard Road to Redfield Avenue	7,400	444	116	<50	<50	57.9
Montgomery Road						
Avenue De Las Flores to Janss Road	4,100	246	91	<50	<50	56.8
Moorpark Road						
Calle Centento to Olsen Road	4,800	288	306	<50	<50	62.0
Olsen Road to Avenue De Las Arboles	8,300	498	529	54	<50	64.4
Avenue De Las Arboles to Avenue De Las Flores	17,000	1,020	1,084	111	<50	66.8
Avenue De Las Flores to Hillcrest Drive	21,500	1,290	1,370	139	<50	67.8
Hillcrest Drive to U.S. 101	27,000	1,620	1,721	174	<50	68.8
U.S. 101 to Rolling Oaks Drive	13,000	780	448	55	<50	62.7
Rolling Oaks Drive to Green Meadow Avenue	5,000	300	175	<50	<50	58.6

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-1 (continued)

Roadway	Average Traffic[b] Daily	a.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Mountcleff Blvd.						
Olsen Road to Avenue De Las Arboles	4,200	252	100	<50	<50	57.3
Newbury Road						
Borchard Road to Madrid Court	7,900	474	272	<50	<50	61.9
Madrid Court to Ventu Park Road	9,300	558	320	<50	<50	62.6
Old Conejo Road						
Reino Road to Wendy Drive	14,000	840	482	52	<50	63.6
Olsen Road						
Starfire Avenue to Moorpark Road	6,300	378	402	50	<50	62.5
Moorpark Road to Route 23	8,175	491	522	61	<50	63.4
Route 23 to city limits	24,000	1,440	1,530	156	<50	68.1
Pederson Road						
Olsen Road to Erbes Road	4,000	240	138	<50	<50	58.4
Potrereo Road						
Reino Road to west city limits	N/A	--	--	--	--	--
Rancho Road						
Hillcrest Drive to Thousand Oaks Blvd.	5,500	330	86	<50	<50	56.7
Thousand Oaks Blvd. to U.S. 101	15,000	900	234	<50	<50	60.7
Rancho Conejo Blvd.						
U.S. 101 to Hillcrest Drive	17,000	1,020	1,084	112	<50	66.7
Hillcrest Drive to Camino Dos Rios	9,100	546	434	<50	<50	63.2
Camino Dos Rios to Ventu Park	N/A	--	--	--	--	--
North of Ventu Park	N/A	--	--	--	--	--
Reino Road						
Lynn Road to Kimber Drive	4,700	282	300	<50	<50	61.6
Kimber Drive to Borchard Road	6,800	408	434	<50	<50	63.2
Borchard Road to Old Conejo	8,700	522	415	50	<50	62.6
Rolling Oaks Drive						
Moorpark Road to Los Padres Drive	6,300	378	99	<50	<50	57.0

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.

b Based on data provided by City Traffic Engineer, September 1986.

c From near travel lane centerline.

N/A Not available.

TABLE A-1 (continued)

Roadway	Average Traffic[b] Daily	a.m. Peak Hour	Leq 55	65	72	At 50 Feet[c]
St. Charles Drive						
McCloud Avenue to Wilbur Road	4,500	270	108	<50	<50	57.6
Sunset Hills Blvd.						
Erbes Road to Westlake Blvd.	N/A	--	--	--	--	--
Thousand Oaks Blvd.						
Marin Street to Moorpark Road	7,800	468	269	<50	<50	61.1
Moorpark Road to Westlake Blvd.	19,600	1,176	675	75	<50	64.5
Westlake Blvd. to city limits	12,500	750	431	55	<50	62.4
Townsgate Road						
Hampshire Road to Westlake Blvd.	8,900	534	424	<50	<50	63.2
Westlake Blvd. to Village Glen	11,000	660	524	56	<50	63.9
Village Glen to Lakeview Canyon	5,100	306	244	<50	<50	60.6
Triunfo Canyon Road						
Westlake Blvd. to city limits	4,900	294	314	<50	<50	61.1
Ventu Park Road						
Rancho Conejo Road to Hillcrest Drive	N/A	--	--	--	--	--
Hillcrest Dr. to U.S. 101	13,000	780	620	72	<50	64.0
Newbury Road to Lynn Road	8,500	510	542	55	<50	64.6
Village Glen						
Agoura Road to Townsgate Road	6,500	390	102	<50	<50	57.0
Wendy Drive						
Camino Dos Rios to Kimber Drive	12,500	750	596	64	<50	64.3
Kimber Drive to Felton Street	6,900	414	329	<50	<50	61.7
Felton Street to Lynn Road	<4,000	240	192	<50	<50	59.4
Westlake Blvd.						
Sunset Hills Blvd. to Valley Springs Drive	N/A	--	--	--	--	--
Valley Springs Drive to Hillcrest Drive	5,400	324	345	<50	<50	61.8
Hillcrest Drive to Thousand Oaks Blvd.	11,000	660	702	82	<50	64.3
Thousand Oaks Blvd. to Townsgate Road	27,500	1,650	1,753	181	<50	68.2
Townsgate Road to Triunfo Canyon Road	17,000	1,020	1,084	117	<50	66.1
Triunfo Canyon Road to Bridgegate Court	10,000	600	638	74	<50	64.1
Bridgegate Court to Potrero Road	5,900	354	378	53	<50	61.8

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-1 (continued)

	Average Traffic[b]		Leq			
Roadway	Daily	a.m. Peak Hour	55	65	72	At 50 Feet[c]
Wilbur Road						
Hillcrest Drive to Moorpark Road	7,200	432	249	<50	<50	60.6
Moorpark Road to Hodencamp Road	9,500	570	328	<50	<50	61.7

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-2

1985 PM PEAK HOUR LEQ CONTOURS BY ROADWAY[a]

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
U.S. Highway 101						
City limits to Rancho Conejo Blvd.	92,000	8,280	2,250	489	178	75.7
City limits to Rancho Conejo Blvd. (6' wall)	92,000	8,280	920	210	120	75.7
City limits to Rancho Conejo Blvd. (10' wall)	92,000	8,280	720	120	120	75.7
Rancho Conejo Blvd. to Rancho Road	116,800	10,512	2,562	556	199	76.7
Rancho Conejo Blvd. to Rancho Road (10' wall)	116,800	10,512	820	155	120	76.7
Rancho Conejo Blvd. to Rancho Road (12' wall)	116,800	10,512	720	120	120	76.7
Rancho Road to city limits	113,000	10,170	2,507	544	195	76.4
Rancho Road to city limits (6' wall)	113,000	10,170	1,015	230	120	76.4
Route 23						
U.S. 101 to Avenue De Los Arboles	43,500	3,915	1,328	293	117	72.1
Ave De Los Arboles to Olsen Road	32,500	2,925	1,094	244	103	71.0
Olsen Road to city limits	18,000	1,620	739	171	<50	68.4
Agoura Road						
Westlake Blvd. to city limits	16,000	1,440	1,143	120	<50	66.7
Avenue De Los Arboles						
Westlake Boulevard to Erbes Road	4,000	360	286	<50	<50	61.3
Erbes Road to Oakbrook	11,000	990	1,052	114	<50	66.0
Oakbrook to Route 23	16,0000	1,440	1,530	159	<50	67.6
Route 23 to Avenue De Las Plantas	21,000	1,890	1,083	111	<50	66.9
Avenue De las Plantes to Mountcleff Blvd.	13,000	1,170	671	72	<50	64.8
Montcleff Blvd. to Velarde Drive	7,430	669	384	<50	<50	62.3
Ave De Las Flores						
Lynn Road to Young Avenue	5,250	473	272	<50	<50	60.9
Borchard Road						
Reino Road to Wendy Drive	8,500	765	608	60	<50	64.3
Wendy Drive to U.S. 101	16,500	1,485	1,179	120	<50	67.3
Camino Dos Rios						
Wendy Drive to Marion Street	9,200	828	475	50	<50	63.8
Marion Street to Lawrence Drive	<4,000	360	207	<50	<50	60.1

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel centerline.
N/A Not available.

TABLE A-2 (continued)

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Conejo Blvd.						
Thousand Oaks Blvd. to Hillcrest Drive	6,500	585	153	<50	<50	58.6
De Havilland Drive						
Hillcrest Drive to city limits	5,400	486	127	<50	<50	58.1
Duesenburg Drive						
Hillcrest Drive to Thousand Oaks Blvd.	6,500	585	152	<50	<50	58.9
Erbes Road						
Sunset Hills Blvd. to Pederson Road	4,700	423	337	50	<50	61.5
Pederson Road to Avenue De Los Arboles	8,200	738	587	67	<50	63.9
Avenue De Los Arboles to Hillcrest Drive	10,233	921	731	77	<50	65.1
Hillcrest Drive to Thousand Oaks Blvd.	7,600	684	543	55	<50	64.6
Gainsborough Road						
Camino Flores to Lynn Road	5,300	477	190	<50	<50	59.8
Lynn Road to Moorpark Road	6,150	554	318	<50	<50	61.5
Hampshire Road						
Thousand Oaks Blvd. to Townsgate Road	23,000	2,070	2,198	224	<50	69.2
Townsgate Road to Westlake Blvd.	15,000	1,350	1,071	109	<50	67.0
Hillcrest Drive						
Lawrence Drive to Rancho Conejo Blvd.	9,900	891	947	100	<50	66.0
Rancho Conejo Blvd. to De Havilland Drive	8,700	783	622	67	<50	64.4
De Havilland Drive to Ventu Park Road	1,400	126	103	<50	<50	56.6
Ventu Park Road to Lynn Road	9,800	882	937	98	<50	66.0
Lynn Road to Moorpark Road	11,500	1,035	1,100	117	<50	66.4
Moorpark Road to Duesenberg Drive	9,080	817	325	<50	<50	61.6
Duesenberg Drive to Westlake Blvd.	5,400	486	193	<50	<50	59.7
Hodencamp Road						
Wilbur Road to Hillcrest Drive	7,300	657	378	<50	<50	62.1
Janss Road						
Lynn Road to Dover Avenue	7,550	680	390	<50	<50	62.4
Dover Avenue to Moorpark Road	13,000	1,170	671	72	<50	64.8
Moorpark Road to Route 23	20,500	1,845	1,058	108	<50	67.0
Route 23 to El Monte	9,600	864	496	56	<50	63.5
El Monte to Erbes Road	5,600	504	289	<50	<50	62.0

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-2 (continued)

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	65	72	At 50 Feet[c]
Kanan Road						
Westlake Blvd. to east city limits	<4,000	360	144	<50	<50	58.5
Kimber Drive						
Knollwood Drive to Reino Road	4,300	387	222	<50	<50	60.3
Reino Road to Wendy Drive	5,900	531	305	<50	<50	61.7
Lakeview Canyon Road						
Agoura Road to Thousand Oaks Blvd.	6,200	558	444	51	<50	63.0
Thousand Oakd Blvd. to Valley Springs Drive	N/A	--	--	--	--	--
Lynn Road						
Starfire Avenue to Avenue De Las Arboles	8,300	747	794	88	<50	65.0
Avenue De Las Arboles to Gainsborough	14,000	1,260	1,338	139	<50	67.3
Gainsborough to U.S. 101	26,000	2,340	2,485	250	<50	70.3
U.S. 101 to Green Meadow Avenue	12,000	1,080	1,149	118	<50	67.0
Green Meadow Avenue to Wendy Drive	5,325	479	510	58	<50	63.5
Wendy Drive to Reino Road	N/A	--	--	--	--	--
McCloud Avenue						
St. Charles Drive to Hillcrest Drive	4,900	441	175	<50	<50	59.7
Michael Drive						
Borchard Road to Redfield Avenue	7,400	666	173	<50	<50	59.7
Montgomery Road						
Avenue De Las Flores to Janss Road	4,100	369	135	<50	<50	58.6
Moorpark Road						
Calle Centento to Olsen Road	4,800	432	459	<50	<50	63.8
Olsen Road to Avenue De Las Arboles	8,300	747	793	80	<50	66.2
Avenue De Las Arboles to Avenue De Las Flores	17,000	1,520	1,625	106	<50	68.6
Avenue De Las Flores to Hillcrest Drive	21,500	1,935	2,055	207	<50	69.6
Hillcrest Drive to U.S. 101	27,000	2,430	2,580	259	<50	70.6
U.S. 101 to Rolling Oaks Drive	13,000	1,170	671	74	<50	64.5
Rolling Oaks Drive to Green Meadow Avenue	5,000	450	260	<50	<50	60.3

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-2 (continued)

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Mountcleff Blvd.						
Olsen Road to Avenue De Las Arboles	4,200	378	150	<50	<50	59.1
Newbury Road						
Borchard Road to Madrid Court	7,900	711	408	<50	<50	63.7
Madrid Court to Ventu Park Road	9,300	837	480	<50	<50	64.4
Old Conejo Road						
Reino Road to Wendy Drive	14,000	1,260	722	75	<50	65.3
Olsen Road						
Starfire Avenue to Moorpark Road	6,300	567	603	65	<50	64.3
Moorpark Road to Route 23	8,175	736	782	84	<50	65.2
Route 23 to city limits	24,000	2,160	2,294	232	<50	69.8
Pederson Road						
Olsen Road to Erbes Road	4,000	360	207	<50	<50	60.1
Potrereo Road						
Reino Road to west city limits	N/A	--	--	--	--	--
Rancho Road						
Hillcrest Drive to Thousand Oaks Blvd.	5,500	495	129	<50	<50	58.5
Thousand Oaks Blvd. to U.S. 101	15,000	1,350	350	<50	<50	62.4
Rancho Conejo Blvd.						
U.S. 101 to Hillcrest Drive	17,000	1,530	1,625	165	<50	68.4
Hillcrest Drive to Camino Dos Rios	9,100	819	650	68	<50	64.9
Camino Dos Rios to Ventu Park	N/A	--	--	--	--	--
North of Ventu Park	N/A	--	--	--	--	--
Reino Road						
Lynn Road to Kimber Drive	4,700	423	450	<50	<50	63.3
Kimber Drive to Borchard Road	6,800	612	650	68	<50	64.9
Borchard Road to Old Conejo	8,700	783	622	68	<50	64.3
Rolling Oaks Drive						
Moorpark Road to Los Padres Drive	6,300	567	148	<50	<50	58.8

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-2 (continued)

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
St. Charles Drive						
McCloud Avenue to Wilbur Road	4,500	405	161	<50	<50	59.3
Sunset Hills Blvd.						
Erbes Road to Westlake Blvd.	N/A	--	--	--	--	--
Thousand Oaks Blvd.						
Marin Street to Moorpark Road	7,800	702	403	<50	<50	62.9
Moorpark Road to Westlake Blvd.	19,600	1,764	1,012	106	<50	66.2
Westlake Blvd. to city limits	12,500	1,125	646	73	<50	64.2
Townsgate Road						
Hampshire Road to Westlake Blvd.	8,900	801	636	66	<50	65.0
Westlake Blvd. to Village Glen	11,000	990	786	81	<50	65.6
Village Glen to Lakeview Canyon	5,100	459	365	<50	<50	62.4
Triunfo Canyon Road						
Westlake Blvd. to city limits	4,900	441	469	57	<50	62.9
Ventu Park Road						
Rancho Conejo Road to Hillcrest Drive	N/A	--	--	--	--	--
Hillcrest Dr. to U.S. 101	13,000	1,170	929	100	<50	65.7
Newbury Road to Lynn Road	8,500	765	812	82	<50	66.4
Village Glen						
Agoura Road to Townsgate Road	6,500	585	152	<50	<50	58.8
Wendy Drive						
Camino Dos Rios to Kimber Drive	12,500	1,125	893	92	<50	66.1
Kimber Drive to Felton Street	6,900	621	493	55	<50	63.5
Felton Street to Lynn Road	<4,000	360	289	<50	<50	61.1
Westlake Blvd.						
Sunset Hills Blvd. to Valley Springs Drive	N/A	--	--	--	--	--
Valley Springs Drive to Hillcrest Drive	5,400	486	517	59	<50	63.5
Hillcrest Drive to Thousand Oaks Blvd.	11,000	990	1,052	114	<50	66.1
Thousand Oaks Blvd. to Townsgate Road	27,500	2,475	2,628	267	<50	70.0
Townsgate Road to Triunfo Canyon Road	17,000	1,530	1,625	169	<50	67.9
Triunfo Canyon Road to Bridgegate Court	10,000	900	956	103	<50	65.8
Bridgegate Court to Potrero Road	5,900	531	565	67	<50	63.6

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-2 (continued)

Roadway	Average Traffic[b] Daily	Average Traffic[b] p.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Wilbur Road						
Hillcrest Drive to Moorpark Road	7,200	648	372	<50	<50	62.3
Moorpark Road to Hodencamp Road	9,500	855	491	55	<50	63.5

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-3

2005 AM PEAK HOUR LEQ CONTOURS BY ROADWAY[a]

Roadway	Average Traffic[b] Daily	Average Traffic[b] a.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
U.S. Highway 101						
City limits to Rancho Conejo Blvd.	94,000	5,640	1,743	381	143	74.0
City limits to Rancho Conejo Blvd. (6' wall)	94,000	5,640	700	170	120	74.0
City limits to Rancho Conejo Blvd. (10' wall)	94,000	5,640	560	120	120	74.0
Rancho Conejo Blvd. to Rancho Road	140,700	8,442	2,214	481	175	75.0
Rancho Conejo Blvd. to Rancho Road (10' wall)	140,700	8,442	700	120	120	75.6
Rancho Conejo Blvd. to Rancho Road (12' wall)	140,700	8,442	620	120	120	75.6
Rancho Road to city limits	116,600	6,996	1,954	426	157	74.7
Rancho Road to city limits (6' wall)	116,600	6,996	790	185	120	74.7
Route 23						
U.S. 101 to Avenue De Los Arboles	55,000	3,300	1,185	263	108	71.5
Ave De Los Arboles to Olsen Road	42,500	2,550	999	214	99	70.4
Olsen Road to city limits	28,000	1,680	757	175	85	68.6
Agoura Road						
Westlake Blvd. to city limits	30,000	1,800	1,429	147	<50	67.7
Avenue De Los Arboles						
Westlake Boulevard to Erbes Road	21,500	1,290	1,024	104	<50	66.8
Erbes Road to Oakbrook	26,000	1,560	1,657	172	<50	68.0
Oakbrook to Route 23	26,000	1,560	1,657	172	<50	68.0
Route 23 to Avenue De Las Plantas	19,000	1,140	654	70	<50	64.7
Avenue De las Plantes to Mountcleff Blvd.	16,000	960	551	60	<50	63.9
Montcleff Blvd. to Velarde Drive	10,000	600	345	<50	<50	61.9
Ave De Las Flores						
Lynn Road to Young Avenue	9,500	570	328	<50	<50	61.7
Borchard Road						
Reino Road to Wendy Drive	10,400	624	496	56	<50	63.5
Wendy Drive to U.S. 101	23,800	1,428	1,134	116	<50	67.1
Camino Dos Rios						
Wendy Drive to Marion Street	12,800	768	441	<50	<50	63.4
Marion Street to Lawrence Drive	8,500	510	293	<50	<50	61.7

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel centerline.
N/A Not available.

TABLE A-2 (continued)

Roadway	Average Traffic[b]		Leq			
	Daily	a.m. Peak Hour	55	65	72	At 50 Feet[c]
Conejo Blvd.						
Thousand Oaks Blvd. to Hillcrest Drive	N/A	--	--	--	--	--
De Havilland Drive						
Hillcrest Drive to city limits	N/A	--	--	--	--	--
Duesenburg Drive						
Hillcrest Drive to Thousand Oaks Blvd.	N/A	--	--	--	--	--
Erbes Road						
Sunset Hills Blvd. to Pederson Road	7,000	420	335	<50	<50	61.5
Pederson Road to Avenue De Los Arboles	10,000	600	477	57	<50	63.0
Avenue De Los Arboles to Hillcrest Drive	11,600	696	553	61	<50	63.9
Hillcrest Drive to Thousand Oaks Blvd.	15,000	900	714	72	<50	65.8
Gainsborough Road						
Camino Flores to Lynn Road	14,000	840	333	<50	<50	62.6
Lynn Road to Moorpark Road	9,000	540	311	<50	<50	61.4
Hampshire Road						
Thousand Oaks Blvd. to Townsgate Road	21,500	1,290	1,371	144	<50	67.1
Townsgate Road to Westlake Blvd.	20,000	1,200	953	97	<50	66.5
Hillcrest Drive						
Lawrence Drive to Rancho Conejo Blvd.	12,600	756	804	86	<50	65.3
Rancho Conejo Blvd. to De Havilland Drive	15,000	900	715	76	<50	65.0
De Havilland Drive to Ventu Park Road	18,500	1,100	881	92	<50	66.0
Ventu Park Road to Lynn Road	21,700	1,302	1,383	142	<50	67.7
Lynn Road to Moorpark Road	30,500	1,830	1,944	198	<50	68.9
Moorpark Road to Duesenberg Drive	9,500	570	227	<50	<50	60.0
Duesenberg Drive to Westlake Blvd.	7,000	420	167	<50	<50	59.1
Hodencamp Road						
Wilbur Road to Hillcrest Drive	N/A	--	--	--	--	--
Janss Road						
Lynn Road to Dover Avenue	8,000	480	276	<50	<50	60.9
Dover Avenue to Moorpark Road	15,000	900	517	57	<50	63.6
Moorpark Road to Route 23	20,000	1,200	688	72	<50	65.1
Route 23 to El Monte	10,000	600	345	<50	<50	61.9
El Monte to Erbes Road	8,000	480	275	<50	<50	61.7

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-3 (continued)

Roadway	Average Traffic[b] Daily	Average Traffic[b] a.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Kanan Road						
Westlake Blvd. to east city limits	10,000	600	238	<50	<50	60.8
Kimber Drive						
Knollwood Drive to Reino Road	11,400	684	393	<50	<50	62.8
Reino Road to Wendy Drive	11,000	660	379	<50	<50	62.7
Lakeview Canyon Road						
Agoura Road to Thousand Oaks Blvd.	32,500	1,950	1,548	157	<50	68.4
Thousand Oakd Blvd. to Valley Springs Drive	15,000	900	714	73	<50	65.5
Lynn Road						
Starfire Avenue to Avenue De Las Arboles	10,000	600	638	74	<50	64.1
Avenue De Las Arboles to Gainsborough	17,000	1,020	1,084	115	<50	66.4
Gainsborough to U.S. 101	38,160	2,290	2,432	245	<50	70.2
U.S. 101 to Green Meadow Avenue	31,000	1,860	1,976	200	<50	69.3
Green Meadow Avenue to Wendy Drive	25,200	1,512	1,606	163	<50	68.4
Wendy Drive to Reino Road	23,000	1,644	1,466	151	<50	67.8
McCloud Avenue						
St. Charles Drive to Hillcrest Drive	N/A	--	--	--	--	--
Michael Drive						
Borchard Road to Redfield Avenue	N/A	--	--	--	--	--
Montgomery Road						
Avenue De Las Flores to Janss Road	N/A	--	--	--	--	--
Moorpark Road						
Calle Centento to Olsen Road	14,000	840	892	90	<50	66.7
Olsen Road to Avenue De Las Arboles	13,000	780	829	84	<50	66.3
Avenue De Las Arboles to Avenue De Las Flores	45,100	2,706	2,873	288	63	71.1
Avenue De Las Flores to Hillcrest Drive	23,100	1,386	1,472	150	<50	68.1
Hillcrest Drive to U.S. 101	29,000	1,740	1,848	187	<50	69.1
U.S. 101 to Rolling Oaks Drive	10,000	600	345	187	<50	61.6
Rolling Oaks Drive to Green Meadow Avenue	6,500	390	226	<50	<50	59.7

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-3 (continued)

Roadway	Average Traffic[b] Daily	a.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Mountcleff Blvd.						
Olsen Road to Avenue De Las Arboles	N/A	--	--	--	--	--
Newbury Road						
Borchard Road to Madrid Court	N/A	--	--	--	--	--
Madrid Court to Ventu Park Road	17,500	1,050	602	61	<50	65.3
Old Conejo Road						
Reino Road to Wendy Drive	12,000	720	413	<50	<50	62.9
Olsen Road						
Starfire Avenue to Moorpark Road	10,000	600	638	68	<50	64.6
Moorpark Road to Route 23	17,000	1,020	1,084	113	<50	66.6
Route 23 to city limits	38,000	2,280	2,422	244	<50	70.1
Pederson Road						
Olsen Road to Erbes Road	6,000	360	207	<50	<50	60.1
Potrereo Road						
Reino Road to west city limits	7,000	420	241	<50	<50	60.8
Rancho Road						
Hillcrest Drive to Thousand Oaks Blvd.	N/A	--	--	--	--	--
Thousand Oaks Blvd. to U.S. 101	N/A	--	--	--	--	--
Rancho Conejo Blvd.						
U.S. 101 to Hillcrest Drive	27,600	1,656	1,759	178	<50	68.8
Hillcrest Drive to Camino Dos Rios	16,200	972	772	79	<50	65.6
Camino Dos Rios to Ventu Park	20,400	1,224	972	99	<50	66.7
North of Ventu Park	11,000	660	524	56	<50	64.0
Reino Road						
Lynn Road to Kimber Drive	4,800	288	307	<50	<50	61.6
Kimber Drive to Borchard Road	8,700	522	555	59	<50	64.2
Borchard Road to Old Conejo	7,800	468	373	<50	<50	62.1
Rolling Oaks Drive						
Moorpark Road to Los Padres Drive	N/A	--	--	--	--	--

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-3 (continued)

Roadway	Average Traffic[b] Daily	a.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
St. Charles Drive						
McCloud Avenue to Wilbur Road	11,900	714	283	<50	<50	61.8
Sunset Hills Blvd.						
Erbes Road to Westlake Blvd.	11,000	660	379	<50	<50	62.8
Thousand Oaks Blvd.						
Marin Street to Moorpark Road	N/A	--	--	--	--	--
Moorpark Road to Westlake Blvd.	24,000	1,440	826	89	<50	65.4
Westlake Blvd. to city limits	15,000	900	517	62	<50	63.2
Townsgate Road						
Hampshire Road to Westlake Blvd.	N/A	--	--	--	--	--
Westlake Blvd. to Village Glen	20,000	1,200	953	98	<50	66.5
Village Glen to Lakeview Canyon	20,000	1,200	953	98	<50	66.5
Triunfo Canyon Road						
Westlake Blvd. to city limits	10,000	600	638	72	<50	64.2
Ventu Park Road						
Rancho Conejo Road to Hillcrest Drive	18,300	1,098	630	66	<50	64.7
Hillcrest Dr. to U.S. 101	23,200	1,392	1,105	117	<50	66.5
Newbury Road to Lynn Road	9,500	570	605	61	<50	65.1
Village Glen						
Agoura Road to Townsgate Road	N/A	--	--	--	--	--
Wendy Drive						
Camino Dos Rios to Kimber Drive	18,000	1,080	858	89	<50	65.9
Kimber Drive to Felton Street	6,400	384	306	<50	<50	61.4
Felton Street to Lynn Road	6,400	384	306	<50	<50	61.4
Westlake Blvd.						
Sunset Hills Blvd. to Valley Springs Drive	10,500	630	670	78	<50	64.2
Valley Springs Drive to Hillcrest Drive	18,000	1,080	1,147	118	<50	67.0
Hillcrest Drive to Thousand Oaks Blvd.	22,000	1,320	1,403	147	<50	67.3
Thousand Oaks Blvd. to Townsgate Road	32,500	1,950	2,071	212	<50	68.9
Townsgate Road to Triunfo Canyon Road	20,000	1,200	1,275	139	<50	66.8
Triunfo Canyon Road to Bridgegate Court	15,000	900	957	103	<50	65.8
Bridgegate Court to Potrero Road	15,000	900	957	103	<50	65.8

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.

b Based on data provided by City Traffic Engineer, September 1986.

c From near travel lane centerline.

N/A Not available.

TABLE A-3 (continued)

Roadway	Average Traffic[b] Daily	Average Traffic[b] a.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Wilbur Road						
Hillcrest Drive to Moorpark Road	15,000	900	516	56	<50	63.8
Moorpark Road to Hodencamp Road	9,000	540	311	<50	<50	61.5

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-4

2005 PM PEAK HOUR LEQ CONTOURS BY ROADWAY[a]

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	65	72	At 50 Feet[c]
U.S. Highway 101						
City limits to Rancho Conejo Blvd.	94,000	8,460	2,283	496	180	75.8
City limits to Rancho Conejo Blvd. (6' wall)	94,000	8,460	930	210	120	75.8
City limits to Rancho Conejo Blvd. (10' wall)	94,000	8,460	735	120	120	75.8
Rancho Conejo Blvd. to Rancho Road	140,700	12,663	2,901	628	223	77.3
Rancho Conejo Blvd. to Rancho Road (10' wall)	140,700	12,663	920	190	120	77.3
Rancho Conejo Blvd. to Rancho Road (12' wall)	140,700	12,663	820	120	120	77.3
Rancho Road to city limits	116,600	10,494	2,560	555	159	76.5
Rancho Road to city limits (6' wall)	116,600	10,494	1,020	235	120	76.5
Route 23						
U.S. 101 to Avenue De Los Arboles	55,000	4,950	1,552	340	131	73.2
Ave De Los Arboles to Olsen Road	42,500	3,825	1,307	289	115	70.4
Olsen Road to city limits	28,000	2,520	991	222	97	70.3
Agoura Road						
Westlake Blvd. to city limits	30,000	2,700	2,143	217	<50	69.4
Avenue De Los Arboles						
Westlake Boulevard to Erbes Road	21,500	1,935	1,536	155	<50	68.6
Erbes Road to Oakbrook	26,000	2,340	2,485	253	<50	69.7
Oakbrook to Route 23	26,000	2,340	2,485	253	<50	69.7
Route 23 to Avenue De Las Plantas	19,000	1,710	980	101	<50	66.4
Avenue De las Plantes to Mountcleff Blvd.	16,000	1,440	826	86	<50	65.7
Montcleff Blvd. to Velarde Drive	10,000	900	516	57	<50	63.6
Ave De Las Flores						
Lynn Road to Young Avenue	9,500	855	491	55	<50	63.5
Borchard Road						
Reino Road to Wendy Drive	10,400	936	743	78	<50	65.2
Wendy Drive to U.S. 101	23,800	2,142	1,700	172	<50	68.9
Camino Dos Rios						
Wendy Drive to Marion Street	12,800	1,152	660	68	<50	65.2
Marion Street to Lawrence Drive	8,500	765	439	<50	<50	63.4

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-4 (continued)

	Average Traffic[b]		Leq			
Roadway	Daily	p.m. Peak Hour	55	65	72	At 50 Feet[c]
Conejo Blvd.						
Thousand Oaks Blvd. to Hillcrest Drive	N/A	--	--	--	--	--
De Havilland Drive						
Hillcrest Drive to city limits	N/A	--	--	--	--	--
Duesenburg Drive						
Hillcrest Drive to Thousand Oaks Boulevard	N/A	--	--	--	--	--
Erbes Road						
Sunset Hills Blvd. to Pederson Road	7,000	630	501	59	<50	63.2
Pederson Road to Avenue De Los Arboles	10,000	900	715	78	<50	64.8
Avenue De Los Arboles to Hillcrest Drive	11,600	1,044	829	87	<50	65.7
Hillcrest Drive to Thousand Oaks Boulevard	15,000	1,350	1,071	108	<50	67.6
Gainsborough Road						
Camino Flores to Lynn Road	14,000	1,260	500	52	<50	64.0
Lynn Road to Moorpark Road	9,000	810	465	53	<50	63.2
Hampshire Road						
Thousand Oaks Blvd. to Townsgate Road	21,500	1,935	2,055	210	<50	68.9
Townsgate Road to Westlake Blvd.	20,000	1,800	1,428	144	<50	68.3
Hillcrest Drive						
Lawrence Drive to Rancho Conejo Blvd.	12,600	1,134	1,205	125	<50	67.0
Rancho Conejo Blvd. to De Havilland Drive	15,000	1,350	1,072	110	<50	66.8
De Havilland Drive to Ventu Park Road	18,500	1,665	1,321	135	<50	67.7
Ventu Park Road to Lynn Road	21,700	1,953	2,074	210	<50	69.5
Lynn Road to Moorpark Road	30,500	2,745	2,915	294	<50	70.6
Moorpark Road to Duesenberg Drive	9,500	855	340	<50	<50	61.8
Duesenberg Drive to Westlake Blvd.	7,000	630	250	<50	<50	60.9
Hodencamp Road						
Wilbur Road to Hillcrest Drive	N/A	--	--	--	--	--
Janss Road						
Lynn Road to Dover Avenue	8,000	720	413	50	<50	62.7
Dover Avenue to Moorpark Road	15,000	1,350	774	81	<50	65.4
Moorpark Road to Route 23	20,000	1,800	1,032	105	<50	66.9
Route 23 to El Monte	10,000	900	516	57	<50	63.6
El Monte to Erbes Road	8,000	720	413	<50	<50	63.5

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.

b Based on data provided by City Traffic Engineer, September 1986.

c From near travel lane centerline.

N/A Not available.

TABLE A-4 (continued)

Roadway	Average Traffic[b] Daily	Average Traffic[b] p.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Kanan Road						
Westlake Blvd. to east city limits	10,000	900	357	<50	<50	62.5
Kimber Drive						
Knollwood Drive to Reino Road	11,400	1,026	588	61	<50	64.6
Reino Road to Wendy Drive	11,000	990	568	59	57	64.4
Lakeview Canyon Road						
Agoura Road to Thousand Oaks Blvd.	32,500	2,925	2,321	233	<50	70.2
Thousand Oakd Blvd. to Valley Springs Drive	15,000	1,350	1,071	108	<50	67.3
Lynn Road						
Starfire Avenue to Avenue De Las Arboles	10,000	900	956	103	<50	65.8
Avenue De Las Arboles to Gainsborough	17,000	1,530	1,625	167	<50	68.1
Gainsborough to U.S. 101	38,160	3,434	3,647	366	<50	72.0
U.S. 101 to Green Meadow Avenue	31,000	2,790	2,963	298	<50	71.1
Green Meadow Avenue to Wendy Drive	25,200	2,268	2,408	242	<50	70.2
Wendy Drive to Reino Road	23,000	2,466	2,198	223	<50	69.5
McCloud Avenue						
St. Charles Drive to Hillcrest Drive	N/A	--	--	--	--	--
Michael Drive						
Borchard Road to Redfield Avenue	N/A	--	--	--	--	--
Montgomery Road						
Avenue De Las Flores to Janss Road	N/A	--	--	--	--	--
Moorpark Road						
Calle Centento to Olsen Road	14,000	1,260	1,338	134	<50	68.4
Olsen Road to Avenue De Las Arboles	13,000	1,170	1,242	125	<50	68.1
Avenue De Las Arboles to Avenue De Las Flores	45,100	4,059	4,308	432	90	72.8
Avenue De Las Flores to Hillcrest Drive	23,100	2,079	2,208	222	<50	69.9
Hillcrest Drive to U.S. 101	29,000	2,610	2,771	278	<50	70.9
U.S. 101 to Rolling Oaks Drive	10,000	900	517	61	<50	63.4
Rolling Oaks Drive to Green Meadow Avenue	6,500	585	337	<50	<50	61.5

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.

b Based on data provided by City Traffic Engineer, September 1986.

c From near travel lane centerline.

N/A Not available.

TABLE A-4 (continued)

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
Mountcleff Blvd.						
Olsen Road to Avenue De Las Arboles	N/A	--	--	--	--	--
Newbury Road						
Borchard Road to Madrid Court	N/A	--	--	--	--	--
Madrid Court to Ventu Park Road	17,500	1,575	903	91	<50	67.1
Old Conejo Road						
Reino Road to Wendy Drive	12,000	1,080	619	65	<50	64.7
Olsen Road						
Starfire Avenue to Moorpark Road	10,000	900	956	99	<50	66.3
Moorpark Road to Route 23	17,000	1,530	1,625	166	<50	68.3
Route 23 to city limits	38,000	3,420	3,632	365	<50	71.8
Pederson Road						
Olsen Road to Erbes Road	6,000	540	310	<50	<50	61.9
Potrereo Road						
Reino Road to west city limits	7,000	630	361	<50	<50	62.6
Rancho Road						
Hillcrest Drive to Thousand Oaks Blvd.	N/A	--	--	--	--	--
Thousand Oaks Blvd. to U.S. 101	N/A	--	--	--	--	--
Rancho Conejo Blvd.						
U.S. 101 to Hillcrest Drive	27,600	2,484	2,638	265	<50	70.5
Hillcrest Drive to Camino Dos Rios	16,200	1,458	1,157	117	<50	67.4
Camino Dos Rios to Ventu Park	20,400	1,836	1,457	142	<50	68.4
North of Ventu Park	11,000	990	786	81	<50	65.7
Reino Road						
Lynn Road to Kimber Drive	14,800	432	459	50	<50	63.4
Kimber Drive to Borchard Road	8,700	783	832	85	<50	66.0
Borchard Road to Old Conejo	7,800	702	558	62	<50	63.8
Rolling Oaks Drive						
Moorpark Road to Los Padres Drive	N/A	--	--	--	--	--

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-4 (continued)

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	Leq 65	Leq 72	At 50 Feet[c]
St. Charles Drive						
McCloud Avenue to Wilbur Road	11,900	1,071	425	<50	<50	63.6
Sunset Hills Blvd.						
Erbes Road to Westlake Blvd.	11,000	990	568	59	<50	64.5
Thousand Oaks Blvd.						
Marin Street to Moorpark Road	N/A	--	--	--	--	--
Moorpark Road to Westlake Blvd.	24,000	2,160	1,238	128	<50	67.1
Westlake Blvd. to city limits	15,000	1,350	775	85	<50	65.0
Townsgate Road						
Hampshire Road to Westlake Blvd.	N/A	--	--	--	--	--
Westlake Blvd. to Village Glen	20,000	1,800	1,428	144	<50	68.2
Village Glen to Lakeview Canyon	20,000	1,800	1,428	144	<50	68.2
Triunfo Canyon Road						
Westlake Blvd. to city limits	10,000	900	956	101	<50	66.0
Ventu Park Road						
Rancho Conejo Road to Hillcrest Drive	18,300	1,647	944	97	<50	66.5
Hillcrest Dr. to U.S. 101	23,200	2,088	1,657	170	<50	68.2
Newbury Road to Lynn Road	9,500	855	908	91	<50	66.9
Village Glen						
Agoura Road to Townsgate Road	N/A	--	--	--	--	--
Wendy Drive						
Camino Dos Rios to Kimber Drive	18,000	1,620	1,286	131	<50	67.6
Kimber Drive to Felton Street	6,400	576	458	52	<50	63.2
Felton Street to Lynn Road	6,400	576	458	52	<50	63.2
Westlake Blvd.						
Sunset Hills Blvd. to Valley Springs Drive	10,500	945	1,004	108	<50	66.0
Valley Springs Drive to Hillcrest Drive	18,000	1,620	1,720	174	<50	68.7
Hillcrest Drive to Thousand Oaks Blvd.	22,000	1,980	2,103	215	<50	69.1
Thousand Oaks Blvd. to Townsgate Road	32,500	2,925	3,106	314	<50	70.7
Townsgate Road to Triunfo Canyon Road	20,000	1,800	1,912	196	<50	68.6
Triunfo Canyon Road to Bridgegate Court	15,000	1,350	1,434	148	<50	67.6
Bridgegate Court to Potrero Road	15,000	1,350	1,434	148	<50	67.6

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.

TABLE A-4 (continued)

Roadway	Average Traffic[b] Daily	p.m. Peak Hour	Leq 55	65	72	At 50 Feet[c]
Wilbur Road						
Hillcrest Drive to Moorpark Road	15,000	1,350	774	80	<50	65.5
Moorpark Road to Hodencamp Road	9,000	810	465	52	<50	63.2

a The distances are in feet from roadway centerline and do not assume any reduction from noise barriers other than along U.S. 101 and Route 23.
b Based on data provided by City Traffic Engineer, September 1986.
c From near travel lane centerline.
N/A Not available.